THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. VI. No 131—9th YEAR.] LONDON, OCTOBER 27, 1857. [Subscription per Ann. { 15s. in Advance / 18s. Credit } DOUBLE No., Price 1s.

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THE METROPOLITAN BOARD of WORKS hereby give Notice that the COMPETITION DESIGNS for Subways under Streets in the Metropolis will, by the kind permission of the Society of Arts, be exhibited at their House in JOHN STREET, ADELPHI, from the 21st inst. until the 21st of November next, between the hours of Ten, a.m., and Four, p.m. Admission Gratis.

E. H. WOOLRYCH, Clerk of the Board.

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Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS RETORTS and OTHER OBJECTS in FIRE CLAY."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire Clay Retorts in the United Kingdom; and orders for Fire Clay Retorts of all shapes and dimensions, Fire Bricks, and every other article in Fire Clay, are promptly executed at their works as above.

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Original Manufacturers of Wrought-Iron Gas Tubes, and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Steam Boilers.

J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest Orders may be executed in a few days.

The eminent Engineer, Mr. Perkins, confines himself altogether to the use of John Russell and Co.'s Tubes in his High-Pressure Steam Patents.

Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanised Tubes, &c.

N.B. All Goods thoroughly Tested before sent out, and Warranted.

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CLERKENWELL, LONDON (E. C.).

Manufacturers of Station and Patent Protector Consumers' Meters, Patent Slide-Valves, Gas-Fittings, Pipes, &c.

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WILLIAM COCHRAN CARR,

begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the Manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other Articles in Fire-Clay, executed on the shortest notice and on the most reasonable terms.

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TOTTENHAM and EDMONTON GASLIGHT and COKE COMPANY.

Notice is hereby given, that the ANNUAL GENERAL MEETING of PROPRIETORS will be held at the LONDON TAVERN, Bishopsgate Street, on WEDNESDAY, the 28th of October, 1857, at THREE o'clock in the afternoon.

By order of the Board,

WILLIAM BLACK, Chairman.

THE WESTERN GASLIGHT COMPANY (LIMITED).

Notice is hereby given, that the ORDINARY GENERAL MEETING of the WESTERN GASLIGHT COMPANY (Limited) will be held at the Company's Offices, No. 28, Argyll Street, Regent Street, London, on THURSDAY, the 5th day of November next, at ONE o'clock precisely, for the purpose of declaring a Dividend for the half year ending the 30th of June last, and of transacting the ordinary business of the meeting.

Vandaleur Benjamin Crake, Lightly Simpson, and Philip Baker, Esqrs., are the three retiring Directors, all of whom offer themselves for re-election.

Notice is hereby also given, that the Transfer Books will be closed on the 29th inst., and will not be reopened until after the meeting.

By order of the Board of Directors,

S. BARBER, Secretary.

London, Oct. 21, 1857.

TO GAS COMPANIES.

BURNHOPE GAS COALS.—Parties wanting a supply of these FIRST-CLASS GAS COALS, which are extensively used by the London, Provincial, and Foreign Gas Companies, will please apply to Mr. M. C. DIXON, 5, Broad Chare, NEWCASTLE-ON-TYNE.

TO GAS COMPANIES AND OTHERS.

AN active, persevering, business man, of good address, is desirous of obtaining an Appointment as Manager of Works, Inspector of Mains, or in any capacity his services may be eligible. The highest Testimonials as to ability, activity, and integrity can be produced. Address, R., 3, Adam's Court, Old Broad Street, CITY.

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Manufacturers of every size and description of Wrought-iron Tubes and Fittings, from one-eighth up to seven-inch internal diameter, for Gas, Steam, or Water.

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for Marine, Locomotive, and Stationary Boilers.

Inventors and Manufacturers of

IMPROVED STEAM AND GAS COCKS,

in Iron or Gun Metal, from three-eighths to six-inch bore. Manufacturers of every description of hand-screwing

STOCKS, DIES, AND TAPS,

for Gasfitters and Engineering purposes.

Manufacturers of Coils, for hot water and other purposes; Casing of all sizes, with flush joints, for Well-sinkers; Blasting Tubes; Buffer Tubes for Railway Carriages; Tubes for Roller Beams; Spindles, Shafts, Pendulums, Hydraulic Presses, Core Bars, Steam Gauges, &c. &c.

JAMES RUSSELL and SONS beg to call the attention of Engineers, Builders, Water Companies, and others, to their

PATENT ENAMELLED TUBES,

which preserve water or other liquids conveyed by them in a perfectly limpid condition; whilst the Enamel itself is as pure as the finest Porcelain, possessing the rare recommendation of being entirely free from any noxious ingredient in its composition.

Lists, Estimates, &c. &c., forwarded on application; orders, from 10 to 100,000 feet of gas tube, executed at twelve hours' notice if required; and quality may be safely relied upon, as all goods are most carefully tested before leaving the Works.

JAMES RUSSELL and SONS have great pleasure in calling attention to the annexed award:—

"EXHIBITION OF THE INDUSTRY OF ALL NATIONS, NEW YORK.

"Office: No. 6, Charing-cross, London, April 6, 1854.

"Gentlemen,—I have much pleasure in informing you that the Jury has awarded to your firm 'HONOURABLE MENTION FOR LAP-WELDED IRON TUBES.' You are at full liberty, if you deem it likely to promote your mercantile advantage, to affix to these articles, during the season 1854, a card whereon this Award is printed, and also your price, with name of agent, &c.—I am, gentlemen, your obedient servant,

"JOHN H. [illegible]

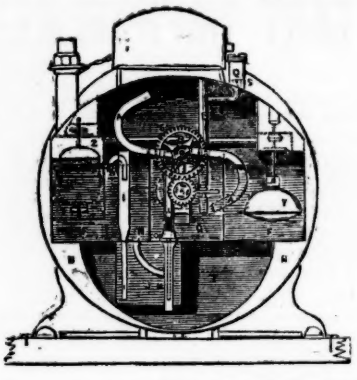
"Messrs. JAMES RUSSELL and SONS, Wednesbury, STAFFORDSHIRE."

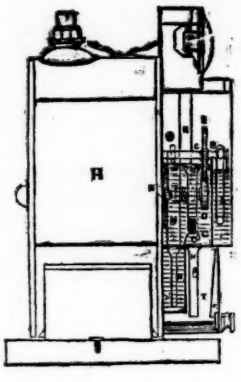
JOURNAL OF GAS LIGHTING NEWSPAPER PENNY

CROSLEY & CO.,

GAS-METER MANUFACTURERS,

103, SOUTHWARK BRIDGE ROAD, LONDON.





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W. CROSLEY'S AND CROSLEY AND GOLDSMITH'S

PATENT STANDARD SELF-ADJUSTING AND COMPENSATING GAS-METERS,

By which the True Water-Line is constantly maintained, and accuracy of measurement at all times secured. SEVERAL THOUSANDS OF THEM HAVE BEEN FIXED, AND ARE NOW AT WORK, and numerous Testimonials from eminent Gas Engineers, expressive of their approbation of them, may be seen at the Manufacturers'.

Manufacturers of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night.

Also, Manufacturers of EXPERIMENTAL METERS, GASHOLDERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c. &c., similar to those used by Mr. King, of Liverpool.

C. and Co. continue to manufacture ordinary WET METERS of the very best description, Mr. W. Crosley having been for many years the principal and confidential assistant of his relative, the late Mr. Samuel Crosley, of Cottage Lane, City Road, up to the time of his decease, in which capacity he communicated to W. C. the secret of the mixture of the metals which has rendered the Crosley Meter so durable and superior to all others, as is evidenced by a large number of them being still at work, after having stood the test of nearly a quarter of a century's use.

By Her Majesty's Royal Letters Patent.

JAMES MEACOCK,

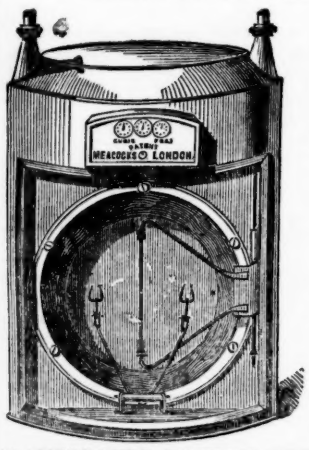
MANUFACTURER OF PATENT DRY AND IMPROVED WET METERS,

Also of every Description of Apparatus used in the Gas Factory, as well as in Gas Distribution.

7, SNOW HILL, AND GILTSPUR STREET, LONDON.

ESTABLISHED 1836.

PATRONIZED BY ALL THE GAS COMPANIES OF THE METROPOLIS, AS WELL AS MOST OF THE PROVINCIAL TOWNS.



J. MEACOCK'S PATENT DRY METER.

OLD VALVE OF THE ORDINARY DRY GAS-METER.

In the accompanying Diagrams of Meters will be seen J. MEACOCK'S patent method of securing the Leather Diaphragm of his IMPROVED PATENT DRY METER. Instead of using the soldering iron for the purpose, by which the Leather is more or less injured, it is held between two flat Metal Rings, and screwed up sound on to a frame to receive it, the outward rim of which and screw-heads are shown in the drawing.

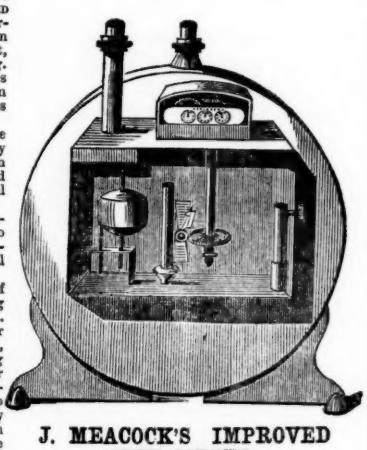
The Valve adopted in the above Patent Meter is also shown, as well as the ordinary Slide-Valve; the advantages of the former in not rising from its facing will be very apparent to the practical Gas Engineer, to whom it is of vital import.

J. MEACOCK begs leave most respectfully to submit to the notice of Gas Companies his PATENT DRY GAS-METER, trusting thereby to receive the same encouragement that has been so kindly awarded him in respect of his Improved Water-Meter, which has been patronized by all the Metropolitan Companies, as well as most of the Provincial Gas-works.

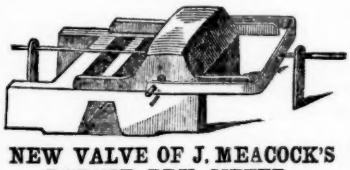
The public having been induced to desire Dry Gas-Meters in preference to Wet, and many Gas Companies being willing to yield to their wishes, J. M. has been induced to apply himself to the production of a Dry Meter, for which he has obtained Her Majesty's Royal Letters Patent.

Very frequently in fitting up the ordinary Dry Meter, the leather of the diaphragm is destroyed during the process of soldering, by coming in contact with the hot soldering iron. In his present process, J. M. has done away with its use, no solder being necessary, the leather being secured by two flat metal rings, between which it is screwed, riveted, or overlaid; the perishing effect of hot tools to leather being avoided, its durability must be longer; also, by this means, its repair when needful is most simple, as a new leather diaphragm can be applied by merely unscrewing the old one from the rim or frame to which it had previously been screwed up sound. In the ordinary Dry Meter frequent variations of registry have been detectable from defective valves, which tilt or rise from their facings: the slide-valve of this Patent Dry Meter will not allow any carbonaceous matter common to coal gas to tilt or lift the slide from its facings, and hence no variation. The heavy wear and tear to which the Meters of Gas Companies are subject, have at all times made it desirable to have them of the best materials and workmanship. J. M. begs leave to assure those who may honour him with their commands, that nothing but the stoutest materials for cases, the hardest gas-resisting metals, and best foreign leather for the interiors, will be used, and none but first-class workmen employed in their construction (the properties which his Improved Water-Meter is well known to possess, and which has obtained him that extensive patronage), will be strictly carried out in his PATENT DRY METER.

In respect of any orders with which he may be honoured, he is willing to give a guarantee to keep the same in repair, *free of all charge*, for three years, and allow the customary discount off the original list price.



J. MEACOCK'S IMPROVED WET METER.



NEW VALVE OF J. MEACOCK'S PATENT DRY METER.

Wet Gas-Meters Repaired and Reconstructed with J. Meacock's Modern Improvements.

METERS SENT ON APPROVAL.

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TO CORRESPONDENTS.

C. R. Mead.—*After the decision of the Courts of Chancery in the case of "Broadbent v. the Imperial Gas Company," no prudent engineer would recommend the erection of a gas-work in the vicinity of a market-gardener or florist.*

J. G.—*Saturday, Nov.* 14, *is the last day for the publication of notices of intended applications to Parliament for Acts during the session of* 1858.

NOTICES.

The subscription is 15s. per annum, if paid in advance, or 18s. on credit, payable in two sums of 9s. each, in July and January of each year, by Post-Office order, at the Charing-Cross Money-Order Office, to William H. Bennett.

The next number will be published on Tuesday, Nov. 10, and the subsequent numbers on each successive alternate Tuesday.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

This JOURNAL has been duly registered at the General Post Office for transmission abroad.

All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to Mr. W. B. King, the Publisher, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING, WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, OCTOBER 27, 1857.

NOTES UPON PASSING EVENTS.

THE Birmingham Congress for the Advancement of Social Science has met, talked, and dissolved, since our last publication; and at least one thing has been proved by the experiment, namely, that the public mind is, at the present day, earnestly bent towards the inquiry into the various phenomena affecting man's existence, or happiness, as a member of the body politic. As this was most unequivocally the temper of the multitudes who met under the guidance of Lords Brougham, J. Russell, and Stanley, of Sir J. Pakington and Mr. Hill, it must be a matter of regret that the leading men, who are conscientiously opposed to the doctrines of the school which seized adroitly enough the monopoly of the attention of the Section of Public Health, should have been so carefully excluded from the original Committee of Management, and should themselves so carelessly have allowed their opponents to remain unchallenged. But so it unquestionably was; and the foremost benches of the audience in the Public Health Section were packed with such skill, that not a voice was raised, or could have been raised, against the ridiculous nonsense or the shameful quackery there uttered by the paid servants of the General Board of Health. Really the apathy of the honest part of community invites the attacks of adventurers; and the society which tolerates the assumptions of a body of self-styled scientific men, or the vagaries of amiable enthusiasts, has only itself to blame, if they be allowed to seize the direction of public affairs.

It is not our purpose at present to notice the composition or the proceedings of the other sections into which the conductors of the Birmingham Congress separated themselves; but we desire to call attention particularly to this one section of Public Health. In the committee of management there were not less than half of the members amongst those who have a direct pecuniary interest in maintaining the present Board of Health; and *we know* that great pains were taken to exclude any person who would be likely to disturb the harmony of the "united happy family." Invitations to assist at the Congress were not sent to any one who had taken a conspicuous part in opposition to the General Board of Health; nor were any facilities offered to them to discuss the doctrines about to be propounded. There was, in fact, a carefully selected corps of performers, and a packed audience; so that the farce of an investigation for the advancement of this branch of social science was adroitly turned into a glorification of the proceedings of the Chadwickian school, or into a valiant refutation of the arguments of its opponents, uttered when there was no chance of a reply. Truly we recognize in all this "the Roman hand" of one of the renowned theatrical writers of the day! Would that we could let fall the curtain with the knowledge that the farce had been played out! There is, however, a strange vitality in error, and unless they who are really anxious to advance the interests of truth in these matters exert themselves vigorously to bring the numerous questions connected with public health before an impartial and really competent tribunal, the bulk of the nation will again be deceived by the unhesitating assertions of the panegyrists of the General Board of Health, or by the mischievous fancies of the amiable enthusiasts of the model-lodging-and-baths-and-washhouses schools.

For, to dispose of the latter first, papers were read describing the efforts made by the Dukes of Bedford and Northumberland, by the Crown, or by private individuals, to improve the dwellings of the poor working men on their estates. We wish distinctly to be understood in making these remarks; and we therefore at once state that we are anxious that nothing we may say should stand in the way of any substantial improvement of the condition of the poor in this or in any other respect. But we conscientiously believe that the measures stated to have been adopted by these philanthropic proprietors are rather calculated to injure than they are to advance the interests of society in general, and as such, that they ought not to be held up for imitation. It was said that both the noble dukes above-named had erected several hundred cottages at an average cost of something like £120 each, and that they let them at rents varying from 1s. to 1s. 3d. per week. Evidently this is but an indirect method of paying a part of the labourer's wages in kind, for the rents we have mentioned are so manifestly below those which must be asked by an ordinary builder, that, as simple operations of house-building, their philanthropic owners would soon be compelled to abandon them. In the meantime, several serious evils are produced by their proceedings. The workmen lose their proper independence, and learn to trust to the charitable feelings of their landlords; and they are, be it observed, without any security that the next owner of the estates will have the same views as those of the present day. Then, the ordinary trading builder is driven from the field by the overwhelming competition of the landowner, who can afford to lose his house-rent, or, at least, has the power of preventing his workmen from going elsewhere than to the houses he provides. If the noble dukes we have named really desired to advance the moral character of their workmen, we believe that they would be more likely to do so by paying them wages which should enable them, in their turn, to pay a fair price for their lodgings; and then take care to furnish them with the means of education, and to maintain a healthy state of moral independence amongst them. The charity which makes men cast upon others the provision for the ordinary wants of life is, after all, but a sickly kind of charity, and it is one which, we fear, will be found eventually to be very injurious to society.

We could not help asking ourselves, whilst listening to these accounts of the erection of many hundred cottages by one landlord, whether, after all, the existing organization of landed property in this country were not itself one of the great evils of our age and society. The tendency of our legislation certainly is to concentrate property into the hands of the few, and to

leave the many without an interest in the State; and, though unquestionably the foreign systems which act to subdivide land to such a degree as to produce a cottier class, devoid of intelligence or real independence, be even more fatal to the happiness of nations than our own, we cannot disguise from ourselves the glaring and the dangerous inequality of ranks and conditions here. This is a very grave question, and one which can hardly be discussed within the limits of a newspaper article; but it is one which, sooner or later, will be forced upon our Legislature. In the meantime, we cannot but express our belief that the practical result of the Model Cottage and Lodging Movement has not hitherto been productive of the good its advocates intended, and that the very poor have not benefited by their efforts. The same thing has happened in this case as in that of the Mechanics' Institutions: the model dwellings have been appropriated by a class for which they never were intended, and which was very well able to take care of itself, whilst the class it was intended to benefit has kept aloof from the interference with its habits which takes place in them. The evil has hitherto lien, firstly, in the practical ignorance of the wants and feelings of the poor amongst the amiable promoters of these lodgings, and in their ill-judged attempts to make both houses and inhabitants models; and, secondly, in the neglect of the commercial part of the question. Until it be proved that a good return is to be obtained from model lodgings, they will not be erected in sufficient numbers to affect the fearful evils under which our working population suffers at home.

But, turning more particularly to the proceedings of the Public Health Section of this Birmingham Congress, we would call attention to the singular fact that, after the General Board of Health has enjoyed the advantages of Government influence for the last nine years, and after it has presented no less than four bills for its own reconstitution, it has only at this late period discovered that the Legislature has entirely omitted to notice the shameful pollution of the watercourses of the country by the various municipal authorities, many of whom have acted under the immediate advice of the officers of the General Board. Mr. Austin, the late secretary to the board, who could so long shut his eyes to the gross derelictions of his principals in this matter, has discovered *now* that public opinion is rather setting against them, and that they have neglected to deal with a very important question; and so he timidly expresses his opinion that something ought to be done to remedy the evils created by the diversion of the sewerage of our towns into the natural drainage-courses of the country. Evidently, if a central board were to be of any use, it would be in discovering, and providing a remedy for, an evil of this kind; and the confession it makes through its former secretary, who is still its principal engineer, that nothing has been done to secure a solution of the problem, may be taken as a bitter satire upon its efficiency. Mr. Rawlinson's paper on the drainage of nine towns may also furnish food to those who are desirous of weighing the value of official assertions. That gentleman states that the average cost of the drainage and sewerage of those fortunate localities, which he is able to parade as an advertisement of his wares, has been £3. 18s. 8d. per house, when even the sewerage is only discharged into the nearest stream. Why, what a commentary does this afford on the statement of Mr. F. O. Ward, so warmly endorsed by Mr. Cowper, that the portion of the "circulation system" connected with the drainage would only require a payment of 1d. per tenement per week! Mr. Rawlinson, be it observed, says nothing of the private improvement expenses, or of the distribution of the sewerage; and yet the results of his experience are that the rate per tenement, to meet even the portion he alluded to, must be more than 1d. per tenement per week.

There were many passages in Lord Stanley's inaugural address, in the rhodomontade of Messrs. Helps, Rumsay, Bracebridge, Chadwick, Simon, &c., to which we shall be compelled to call attention hereafter. We wish it, however, to be understood, that there was hardly one assertion made by them which we do not question, hardly one principle laid down from which we do not dissent—from Lord Stanley's assertion that all mortality beyond 17 in 1000 was artificial, to Mr. Helps' doctrine that the State ought to interfere in the domestic arrangements of our population. But, for the present, we are compelled to pass over these important subjects of discussion, and even to dismiss those to which we can refer with a brevity we much regret. Yet we cannot allow Mr. Tom Taylor's paper to pass without at once calling the attention of our readers to the disingenuous manner in which he and his principals of the General Board of Health—members, be it observed, of the committee of this section of the Congress, and therefore well aware that Mr. Toulmin Smith did not intend to take any decided part in the proceedings of the meeting—proceeded to misstate the arguments of that gentleman when they knew that he was not likely to be present. Mr. T. Smith has promised, in a letter to the *Times*, to examine our eminent farce writer's paper; and we, therefore, for the present, reserve our own remarks in reply to the vapid declamation contained in this elaborate defence of the "hungry officials, devoid alike of capacity and honesty, equally deficient in a sense of public duty and respect for private morality," to quote the very words of Mr. Tom Taylor. We cannot, however, refrain from remarking, that an important part of this gentleman's argument is based upon this singular fallacy, that for local government we cannot depend upon commanding "the best local materials," whilst he leaves it to be inferred that the central government is more fortunate, and does command the services of the most honest and most capable men. To this, of course, the answer is simply to refer to the shameful failures of the favourite engineers of the General Board of Health, and to Sir B. Hall's bitter accusations of that board on account of the jobbery it patronized or fostered.

It is odd, too, that about the same time that the organs of the General Board of Health were thus attacking "local materials," it should have published such a singularly ridiculous document as Mr. Alfred Dickens' "Report on the Dispute between the Guardians of the Eton Union and the Nuisances Removal Committee of Upton-cum-Chalvey." Mr. Dickens was invited to offer some suggestions as regarded the drainage works of this locality (according to his own statement); so, after inditing a long letter upon the present state of the ditches, cesspools, and drains, he winds up by saying that the best method of settling the very silly dispute which has arisen, would be to obtain a preliminary inquiry under the Public Health Act. Now, if this were all the results of his mission, we cannot see why Mr. Dickens should not have made his recommendation without putting the respective parties to the expense of his journey; and, under any circumstances, it must appear a singular mode of settling a dispute upon a very simple technical question, to recommend the local authories to abdicate their own powers into the hands of the General Board. This is just the tale of *l'Ours et le Pacha:* "You want a fish such as was never seen?"—"Yes."—"Then take my bear!" A question arises as to the liabilities of certain parties in a matter of common justice; and, forsooth, the party they call in to settle the dispute, recommends them to place themselves under the fatherly care of his regular employers, but he says nothing upon the merits of the case submitted to him. All this, moreover, published under the sanction of a quondam professor of English literature, and of the Vice-President of the Board of Education, is written in a style which would insure the rejection of a candidate for a situation as landing waiter. Truly, "centralism" is not always successful in securing "the best materials."

Our old friends of the Registrar-General's office have also, of late, favoured the public with some elegant specimens of official fine writing. In the "Weekly Return of Births and Deaths in London for October 17," they say "that an immense commerce is carried on between England and Hamburg on the Elbe," &c., which may imply that England itself is upon the Elbe; that the berths of the steamers are "at times saturated by the steam of the water-closets," though in the numerous voyages we have made by sea we never saw steam issue from this part of a vessel; and then they go on to say, "that, to avoid the delays of quarantine, all steamers should undergo sanitary inspection, and the sailing vessels in the river should be thoroughly cleansed. They should get pure water. And they would not then form a bridge over which epidemics can march from Hamburg to London!" Think of this being printed at the expense of our practical nation! After all the labours of the Board of Health to secure the abolition of quarantine, that questionable precaution is to be revived if good water-closets be not placed in passenger-ships, whilst all allusion to bilge-water is omitted. Then, because steamboats have "berths saturated by the steam of water-closets," sailing-vessels should be properly cleansed, and should get good water; the result of all which, we are told, would be that the sailing-vessels would not form a bridge over which epidemics could march! What a pity it is that these central authorities

cannot even write English! and we earnestly invite Lord Palmerston's attention to the subject, for we are convinced that he who could lecture schoolmasters so roundly on their neglect of caligraphy, cannot approve of the systematic "murdering of the Queen's English" which is in fashion in the Government offices.

We call the attention of the shipping interests, however, to the threatened interference with their avocations. Not content with the examination of the hulls, engines, boilers, boats, &c., it seems that a new set of officers are to be appointed to examine the water-closets—at the expense of the shipowners, of course.

We observe that at length the General Board of Health has issued, in a very garbled form, the returns moved for by Mr. Tite nearly eighteen months ago, of the financial position of the various local boards. We have not yet been able to examine it with the attention it requires, but certainly we will return to this subject in a future number of our JOURNAL. It will be curious to compare the actual cost of the works executed in the various towns under the superintendence of the General Board, with the estimates originally presented by the superintending inspectors to induce the inhabitants to place themselves under the Public Health Act.

THE COMPETITION DESIGNS FOR THE SUBWAYS OF LONDON.

ON Monday and Tuesday last we were admitted to the private view of the designs for subways sent in to the Metropolitan Board of Works, in reply to its invitation to the engineering public; and we have received a copy of the report by the committee appointed to consider them and to award the prizes offered by the board in this intellectual lottery.

No doubt in some parts of London, where the traffic is the most incessant, the annoyance occasioned by the opening of the ground (in order to visit, repair, or alter the sewers, the gas, water, or telegraph-wire pipes) must be very great; and we can easily understand that society should make a vigorous effort to obviate this source of inconvenience and loss. But we very seriously question whether the importance of this annoyance be so great as to justify the adoption of the measures which would appear to be indispensable before any remedy to the existing state of things can be found. Our neighbours, the French, have for many years turned their attention to this subject; the able engineers of the municipality of Brussels have likewise made several attempts towards the solution of its difficulties; and now the Metropolitan Board of Works has succeeded in obtaining, for the magnificent sum of £246. 15s., 39 designs by English engineers, as their contributions to the general stock of knowledge with respect to subways. The result of this labour has hitherto been simply to prove that whatever good may be obtained by dealing with all these details of the public service on a general system, it is only to be secured by a very great outlay; and so great must this outlay be, that it is more than questionable whether it would be justifiable to incur it upon any principles of social or political economy. To our minds, also, there are technical objections to every one of the projects entertained either here or abroad, to which allusion will be made hereafter.

We cannot say that we entirely agree with the selection of the committee, or at least we are unable to explain upon what principles the first prize should have been awarded to design No. 19, when almost every object it provides for is effected by the design No. 9, in nearly as simple and efficacious a manner; whilst there cannot be the shadow of a doubt as to the superiority of the latter in a technical or an artistic point of view. The conclusion, however, that there were "great difficulties in the way of arriving at a satisfactory decision;" and that "no general principles were found to apply, nor was it possible either to approve or condemn all the parts of any of the designs submitted to competition," although expressed in a style worthy of the Board of Education, or of the General Board of Health, is substantially correct. None of the designs possess much originality of conception; none of them suggest a really simple or effectual method of remedying the evils of our present streets; for it must be observed, that even if it were desirable to incur the outlay of forming the expensive subways thus suggested in new streets, it is quite another thing to disturb all existing arrangements in order to attempt to introduce a theoretical perfection in those which have long been used. It is also to be feared that a practical difficulty will be found to exist in London from the fact that so many gas, water, and telegraph pipes exist under our present roads, and that so many parties have parliamentary titles to disturb them, that it would be difficult to induce these parties to co-operate in any change involving an outlay to them. The competition, however, was designedly for *new* streets; and therefore, of course, this difficulty might be considered not to exist; and our remarks, like the suggestions of the competitors, must be made without reference to the actual state of our roadways. Even when thus narrowed, we cannot say that we think that the authors of the various schemes submitted have successfully dealt with the subject.

For, in the first place, inasmuch as one of the most important functions of a sewer is to remove all surface and land drainage-waters, the sides and top ought to be constructed of such materials as should allow such waters to enter; in other words, if the invert of a sewer ought to be impermeable, the upper part ought to be permeable. Now, if the said upper part be permeable for water, *à fortiori* it would be permeable for air, and we cannot but consider that all the designs submitted to the board are defective in this respect—that they do not necessarily comprise any provision, for creating a strong ventilation in such wise as to draw all the air downwards through the sewers. In the second place, we more than question the advisability of placing the gas and water mains in the same gallery, especially in galleries with a ventilation so deficient as the one which would exist in any of the systems proposed; and we certainly believe that very great inconvenience would be found to arise from the communication of the noise and vibration produced by the traffic, without some additional precautions to those indicated on these plans. Several of the "premiated" designs, as our neological contemporary, the *Builder*, would say, provide double galleries for the pipes of the companies which now use the sub-stratum of our roads; but they have, singularly enough, placed them close under the curb of the foot-pavements, or precisely on the line of the heaviest traffic. The design No. 11 seems to us objectionable on this score; No. 32 seems even more objectionable still, because it proposes to carry the gas-pipes in a species of channel, the top of which would form a broad step at a lower level than the pavement; No. 19 contemplates the excavation of the whole of the ground under the roadway, but we very much question the necessity for such an extraordinary amount of cellarage, and this system would involve a great additional outlay; it is for this reason that we prefer No. 9 to No. 19, although unquestionably, if the cellars were ever executed, it would be easier to examine and repair the house service-pipes upon the former system than upon the latter, which contemplates the filling in of the ground over and around the subway. The successful competitors for the second-class prizes have not suggested anything worthy of notice, and, indeed, we are utterly unable to understand the merits which have secured this distinction for No. 27. This design consists simply in the introduction of a cross girder in the sewer, to carry the various pipes and mains. None of the other competitors, we repeat, have suggested anything worthy of consideration, and we can, indeed, easily understand the difficulty the committee must have experienced in either "approving or condemning" them.

It would appear from the estimates which accompany these designs that at the most moderate computation, and even supposing that the whole of the works were to be executed for the first time, the cost of a tolerable system of subways cannot be less than from eighteen to twenty guineas per yard lineal. This would be equivalent to a rent-charge of about five guineas per annum on a 21-feet frontage, allowance being made for depreciation, repairs, sinking-fund, &c.; and we seriously ask whether the advantages to be gained would be such as to justify so heavy a burthen? Possibly in such a street as Cheapside, or the Poultry, Leadenhall, Lombard, or Threadneedle Streets, it might be worth while to secure immunity from interruption of the traffic at such an expense; or, perhaps, in forming streets in quarters of the town where the roadway is artificially raised, as in Tyburnia, it may be nearly as cheap to construct subways as to fill in the ground. But, evidently, these are exceptional cases, and for all ordinary streets it must be cheaper to continue the system hitherto adopted; to lay pipes and form sewers under the roadway, and to pull up the latter whenever changes or repairs are required. This is, no doubt, very slipshod, and very slovenly; but certainly, at present, it is far cheaper than any of the systems proposed to replace it. Emphatically, the whole question is a pecuniary

one; and we are more than ever convinced, after seeing the competition designs submitted to the Metropolitan Board of Works, that there is no substantial inducement for an alteration in the existing arrangements of the subterranean municipal works, if such an expression be allowed. The fact is, that they who proposed a competition for this purpose were led away by one of the follies of the day; and perhaps, after all, the public has reason for thankfulness, because the competition has at least proved the utter impracticability of effecting the object in view.

THE BURSTING OF A BUBBLE.

Time passes so quickly that we were surprised to find, on referring to our columns, that two years have elapsed since we exposed, under the title "A New Scheme Revived," the hollowness of the great French bubble, *L'Union des Gaz*. That bubble has been more tenacious than such structures usually are, for it was held together at the first by £200,000 of deposits on shares, and was maintained in existence by £200,000 more: but the bubble has burst at last. Its capital of 10,000,000 of francs has disappeared; the shares, which once bore a premium of 100 per cent., have become a drug in the market at one quarter their nominal price; and the shareholders have had woful experience of the truth which the original concoctors of the scheme had the impudence to announce in their prospectus, that "Many new companies are formed on bases which, if not fictitious, are at least hazardous, and do not allow the capitalist to appreciate beforehand the merit of the undertaking in which he embarks; and thus he exposes himself to the entire loss of the sum he invested." We said at the time that the prospectus spoke like an oracle, and verily its predictions have been fulfilled to the letter.

The facility with which the bubble was blown to so gigantic a size on the Paris *Bourse* is the more remarkable, because the system of manufacturing gas on which it professed to depend had been tried again and again in this country and in France, and in every previous instance it had failed. The object of the company was stated to be, to apply the heat usually lost in the manufacture of coke to the distillation of coal in retorts, the production of gas being considered only secondary to the production of coke. Now it so happens, most provokingly against the success of such schemes, that the slow carbonization of coal in large masses, which is necessary to give the required solidity to coke for the furnaces of locomotive engines, is incompatible with the production of good illuminating gas. Or, if the escaping heating power be applied to gas-making retorts, the results are equally unsatisfactory, for the heat is neither sufficiently great nor constant to sustain the necessary temperature. The description accompanying the original prospectus of the special process of manufacture was so vague, that it might mean one or the other or both methods. With great pretence of explanation, it left the matter in doubt, the only points that were brought out forcibly and clearly being that good illuminating gas was to be made for less than nothing, and that, at the lowest computation, the dividends would exceed 40 per cent. The announcement concluded by saying, "that a company founded on a basis like that of *L'Union des Gaz*, offered its shareholders *entire security* for their money, and that the future would prove to them that they could not make a more advantageous investment, for, in a short time, the original capital would be more than doubled." It only required confidence in the declaration that there would be considerable profit on the mere manufacture of the gas, even if given away, to believe all this and much more.

M. Omer Salmon, the projector of *L'Union des Gaz*, professed to be able by his patent process to supply gas at rates before unknown in France or elsewhere. The proffered advantages were so great, that it was anticipated every town on the Continent would be anxious to join *L'Union des Gaz*. The plan proposed was to buy up the established gas-works, and gradually to introduce into them the patented process of M. Omer Salmon, for which patent the company had paid him £80,000, in addition to £16,000 for the works he had established at Cramaux. Sixteen towns in France are mentioned as included in the union, and the operations of the company are said to have reached to Madrid, Modena, Palermo, Parma, and Alexandria in Piedmont. Such extended ramifications of M. Omer Salmon's system must have arisen from confident belief in the representations of the benefits to be derived from its adoption; and the shareholders were taught to look upon each addition to the union as a direct increase of their dividends. Monthly accounts were published showing augmented profits as the operations of the company extended, and the following one, for November, 1856, exhibits the brilliant appearance of the bubble at that time:—

In the course of the month of November the works of Toulouse, Albi, Villefranche, Vaise, Beaucaire and Tarascon, Cette, Vienne, Roanne, Rueil, Nismes, Strasbourg, and Genoa have given the following results:—

	kils.
Coal distilled for the production of gas	2,489,928
Coal converted into solid coke in the ovens, and causing the distillation of the coal during its conversion	608,852
	3,098,780
Coke used for heating the old retorts not yet adapted to the system	331,934
PROCEEDS.	frs.
Gas supplied to public and private burners	162,475
Coke	71,321
Tar	4,482
	238,278
EXPENSES.	
Coal for distillation	97,345
Do. for the coke ovens	21,293
Coke used for heating	11,856
General expenses	14,862
	145,356
Profit	92,922
Profit from the same works in the preceding month	87,948
Increase	4,974

The accounts of operations at the works at Modena, of which the company took possession on the 1st of November, not having been received, the profits from that undertaking are not included in the foregoing account.

Such a state of affairs presented astonishing as well as gratifying results from the process of M. Omer Salmon, who appears to have been able to convert 608,852 kilogrammes of coal into solid coke without any fuel, and during its carbonization to have distilled by the heat given out 2,489,928 kilogrammes of coal in the gas retorts. The small quantity of coke resulting from the operation is, however, greatly at variance with the original prospectus, which stated the principal object of the company to be the production of coke, the gas being only a secondary product. It is probable that, after the miserable failure of the process at Toulouse, which was left in darkness when M. Omer Salmon attempted to light it, the old gas-works added to the company were allowed to remain unaltered, and this would account for the deficiency of coke. But it is useless to examine the accounts more closely, for they will probably be submitted to a different tribunal. Within two months of the presentation of that brilliant vision the bubble exploded, and the whole affair fell to the ground from the want of money to carry it on.

In the previous June, indeed, the pressure for money began to be felt, and the *gérant* had recommended, and the shareholders had adopted, resolutions for raising the capital of the company from £400,000 to £800,000, by the issue of additional shares. To facilitate that operation, and to extend the sphere of action, it was announced that negotiations had been entered into with the company of which M. Marguerite was the head for a combination of interests. This proposed coalition having been delayed, and the new shares being even then unsaleable, the *gérant* of *L'Union des Gaz* pressed M. Marguerite so urgently to join, that he consented to complete the arrangement; but his sudden death extinguished the hope of again floating the scheme on the Paris *Bourse* by the aid of his character and influence, and *L'Union des Gaz* seemed to be once more completely aground.

In the meantime the shareholders, naturally enough, began to inquire what had become of their money, and how it happened that, with large profits and dividends of 15 per cent., the company should be thus wrecked in a sea of prosperity. We understand that discoveries were soon made which opened their eyes to the real position of their affairs, by disclosing an expenditure far greater than indicated in the published accounts, and that the dividends had been paid out of the capital. The "cooking" of the accounts of a public company, for the purpose of raising the value of shares, is an offence punishable by the law of France; and it is stated that the former *gérant* of *L'Union des Gaz* will probably be compelled to render an account to the correctional police much less agreeable to his feelings than the accounts he has heretofore presented so exultingly to his willing dupes.

The capital of £400,000 is, however, not altogether lost. Some parts of the wreck remain invested in gas-works purchased at high prices in different towns, the works at Strasbourg alone having cost nearly £42,000; and the value of those works has

not been diminished by the introduction of M. Omer Salmon's system of manufacture. Most fortunately for the shareholders, two enterprising Englishmen resident in Paris have undertaken to supply the place of M. Marguerite, and to collect the scattered portions of the wreck, and to put them together in a working shape. Before establishing the new order of things, it was needful, however, that M. Omer Salmon should be relieved from the responsibilities of management. His resignation was accordingly tendered and accepted, and his dismissal from the company may be considered a final blow to the Omer-Salmon process of manufacturing gas in conjunction with oven coke.

A commission was appointed to examine the accounts of the company, but the result of the examination has not transpired, and the public are yet ignorant of the real state of affairs in June, 1856, when a dividend of 15 per cent. was declared. A public meeting of the shareholders was held on the 30th ult., at which it was announced that Mr. E. E. Goldsmid and Mr. W. B. Gregory had definitively accepted the office of *gérants* of the company. Resolutions were passed for raising money to carry on the operations by the issue of debentures on the personal security of the *gérants*, in addition to the security of the property of the company, which was absurdly estimated at nearly £450,000, including the concessions, gas-works, the worthless patents, materials, and fixtures. The funds of the company are to be represented by shares to the amount of £320,000, and debentures to the amount of £280,000; of which as many as will produce £200,000 are to be issued immediately. Debentures of £10 each are to be issued at £8. 16s., and are to bear a yearly interest of 12 shillings, or 6 per cent. on £10. We understand from a gentleman well acquainted with the affairs of the company, that from the preposterously high valuation of the assets, there is to be deducted £250,000 for existing liabilities; and when from the balance there is further deducted the sum of £80,000 paid to M. Omer Salmon for his patents and gas-works, the remains of the original capital will not go far towards securing payment of the loan of £200,000.

Under the responsible management of Messrs. Goldsmid and Gregory it is possible that something may yet be gained out of the wreck of *L'Union des Gaz*, and the 250 franc shares of the company have already risen from 30 to 80 francs; but to have any chance of success they must entirely reject the often tried, yet never successful, scheme of M. Omer Salmon. Successful, indeed, it has been, in one sense, though not in that contemplated by the shareholders; it has succeeded in filling the pockets of the projector at their expense.

Circular to Gas Companies.

The arbitrators in the important matter of Mr. Croll and the Great Central Consumers' Company have held three sittings during the past week, and afterwards adjourned, for the convenience of counsel, to Nov. 9. It appears from the case, as opened by counsel, that Mr. Croll claims £34,783 for professional services, misappropriation and waste of gas, increase in illuminating power, and other minor items, besides a large sum for stock in trade and extensions of plant; but as the case has been only partially heard, and the company will be precluded for some time to come from giving their version of the transactions, it would be premature in us to publish any report of the proceedings. We regret, however, to see that a similar discretion has not been exercised in other quarters, and that the *Observer*, of the 25th instant, devotes nearly three of its columns to a garbled, and, in many instances, inaccurate report of the *ex parte* evidence already tendered, upon which it also comments in a manner that may not be justified by the facts when they are all before the arbitrators. Such indiscretion merits the severest reprobation, and cannot fail to recoil upon those through whose connivance a new element of discord has been imported into the already embittered dispute between the parties.

At the request of several of our subscribers we subjoin abstracts of the fifteen Acts of Parliament relating to the supply of gas which were passed during the last session. Seven of these were for the incorporation of companies that were previously acting without parliamentary authority; five were for the amendment of existing Acts and for obtaining additional powers; one was for the amalgamation of two companies; one for regulating the payment of dividends on preference shares; and one for the transfer of works to commissioners. In all these Acts, with the exception of that for regulating the payment of dividends, clauses are inserted to provide for the testing of the quality of the gas by experimental meters on the premises of the companies, who are to have six hours' notice before the experiments are made. The costs of the experiments are to be borne by the parties making application for the test where the quality is proved to be equal to the parliamentary standard, and when below it the companies are to pay the cost, in addition to a penalty not exceeding £20. The minimum quality is, with three exceptions, fixed at 12 sperm candles of 6 in the pound, burning 120 grains per hour.

Burslem and Tunstall Gas Company.—This company, which was registered in 1837, is incorporated. The capital is to be £20,000, including £8000 of existing share capital. The sum of £2000 expended on the works out of the revenue account is to be repaid to the shareholders, and repayment is also to be made of £1000 borrowed from the directors, leaving the capital of the company £20,000, with the power of borrowing £5750. The amount of dividends on the old shares is limited to 10 per cent., and on the new shares to 7½ per cent. The land to be held by the company is not to exceed five acres. The number of directors is not to be less than five, with a qualification of ten shares. The scale of voting at meetings is at the rate of one vote for £25; above £20 and under £50 two votes; above £50 and under £100 three votes; above £100 and under £200 four votes; and above £200 five votes. The maximum price of gas is fixed at 5s. per 1000 feet, and the town lamps burning five cubic feet per hour £2. 15s. per annum, the lamps not being lighted for four nights at full moon. The quality to be equal to 10 sperm candles of 6 in the pound.

Bury Gaslight and Coke Company.—The object of this Act is to authorize the transfer of the works of the Bury Gaslight and Coke Company to the Commissioners for Improving the Borough. The share capital of the company amounts to £23,378, and they have borrowed on mortgage £8200, the whole of which has been expended on the works. In consideration of the transfer to the commissioners of the property of the company, the shareholders are to receive 925 perpetual annuities of £2 each, one annuity of £2 being given for each £20 share. The annuities are to be the first charge on the property of the commissioners, the whole of which, with the exception of the Bury sewer rate, is chargeable with their payment. The annuities are to be redeemed within twenty years from the first of January next, the order in which they are to be redeemed being determined by ballot. The rate of redemption is £50 for every £2 annuity. The commissioners have power to borrow £55,000, in addition to the money borrowed by the company, £45,000 of which is to be applicable only to the redemption of the annuities. The price of gas to private consumers is limited to 5s. per 1000 feet, and the public lights are to be charged on the lowest scale to private consumers. The commissioners are bound by the same regulations for testing the quality of the gas as gas companies. The Act is to come into operation on the 1st of January next.

Chepstow Gas and Coke Consumers' Company.—This is an Act of Incorporation. The Chepstow Gas and Coke Company (Limited) were registered in June, 1856, with a subscribed capital of £5000, divided into £10 shares, and with power to borrow £2000. The capital of the incorporated company is to consist of £7000, with a borrowing power to the extent of £1750. Of the share capital, £5000 is to be divided into 500 £10 shares, to be called Class A to be appropriated to the previous shareholders, the dividends on which are limited to 10 per cent. The remaining shares, to be called Class B shares, are to be limited to a dividend of £7. 10s. per share. The maximum price of gas is fixed at 5s. per 1000 feet. The power to purchase land is limited to two acres. Every £10 share in the company entitles the holder to a vote at the general meetings; and the company have power to reduce the number of directors to three.

Cork.—The object of this Act is to give the United General Gaslight Company additional power to carry on their operations in the city of Cork. The powers of the Wide Street Commissioners of Cork, with whom the company had contracted to light the city, having been transferred in 1852 to the corporation, they found it necessary to apply to Parliament for powers to maintain their existing works, mains, and pipes, and to lay down others. The whole capital of the United Genera[l]

Gaslight Company is £450,000, of which £56,000 has been expended on the works in Cork. The Act provides that a separate account shall be kept of the expenditure and receipts in Cork, and that the dividends shall be limited according to the provisions of the Gas-Works Clauses Act. The minimum quality of the gas is to be 10 sperm candles, and the maximum charge to consumers 6s. per 1000 feet, including meter-rents. The corporation are empowered to appoint an inspector of meters at their own cost. A clause in the Act gives the company power to sell or lease their works to the corporation, or to enter into contracts for supplying the corporation with gas.

Glasgow Gaslight Company.—This company have obtained five Acts of Parliament since they commenced operations in 1817. The company have raised £150,000 of share capital; they have obtained £49,724 from premiums on the sale of shares; they have borrowed £10,000; and the sum of £29,104 arising out of profits divisible among the shareholders has also been expended on the works. The present Act empowers the company to create 2600 new shares of £25 each, and to borrow £70,000, including the previous loans. The dividends on shares created before the passing of this Act are limited to 10 per cent., and the dividend on subsequent shares is limited to £7. 10s. per cent. The sum of £29,104 arising out of profits is to be retained as a reserve-fund, for payment of any deficiency in the amount of dividends since May, 1856, or any deficiency that may occur in future. The land to be held by the company is not to exceed 25 acres. The maximum price of gas is 5s. 6d. per 1000 feet.

The City and Suburban Gas Company of Glasgow.—This company are empowered to raise, by the creation of new shares, £50,000, in addition to their capital of £150,000, with further power to borrow a sum equal to one-fourth of the paid-up capital. The dividends on the new shares are not to exceed 7½ per cent. The qualification of the directors is to consist in the possession of 25 shares, and their number may be reduced to five. Power is given to the company to purchase three additional acres of land adjoining their present works. One of the clauses provides that all new pipes laid down by the company in future are to be marked, so as to distinguish them from the pipes of any other company. There is also a provision against amalgamation with any other company, either existing or future; and the pipes are not to be so laid as to prevent the Glasgow Gaslight Company from having free access to their own pipes. The minimum quality of the gas is fixed at ten sperm candles, and the maximum price at 5s. 6d. per 1000 feet.

Guildford Gaslight and Coke Company.—The Act incorporates the company, which was established in 1824. The original capital of the company was £3500, but it has been increased to £8800, divided into 352 shares of £25 each. They have borrowed £800, and expended £1056 out of the revenue account upon the works. The Act of Incorporation raises the capital of the company to £20,000, to consist of three classes of shares. First, the original 352 shares, called class A; second, class B shares, consisting of 352 shares of £3 each, being the amount of revenue expended on the works, both of which classes of shares are to be appropriated as paid-up shares by the original shareholders; and class C includes the new shares. Class B shares are to be paid a preferential dividend of 5 per cent., and no more. The dividends on class A are limited to 10 per cent., and on class C to 7½ per cent. The company are further empowered to borrow £5000. The scale of voting at general meetings is one vote for the first share of £25; the holder of four shares to have two votes; and the holder of ten shares and upwards to have three votes. The quantity of land to be purchased by the company is limited to two acres, and the maximum price of gas is fixed at 6s.

London Gaslight Company.—The Act for "Regulating the payment of dividends on certain classes of preference shares in the London Gaslight Company," empowers the company to create two debenture stocks amounting to £20,945 and £13,986, to be vested in the owners of preferential shares created in 1840 and 1842 as discharge of their claims for unpaid dividends; the whole sum of £34,931 having been appropriated by the company in former years out of the revenue to the improvement and enlargement of the works instead of having been divided among the shareholders.

Shrewsbury Gaslight Company.—The original Act for incorporating this company limited the capital to £10,000, and an additional £10,000 has since been expended on the works out of the revenue applicable to dividends. The object of the present Act is to increase the capital of the company to £40,000, including the sum taken from the revenue account. The Act divides the shares into three classes. Class A includes the previous shareholders, with a limitation of dividend to 10 per cent.; Class B shares include the £10,000 of revenue capitalized, which shares are to be appropriated by the previous shareholders, and are to have a limited dividend of 5 per cent.; and the shares of Class C are those to be created with a limited dividend of 7½ per cent. Among the provisions of the Act, power is given to purchase land, not exceeding three acres, adjoining the present works; the number of directors is not to be reduced below five; and the maximum prices of gas are 6s. per 1000 feet within the borough of Shrewsbury and 7s. beyond it.

South Shields Gas Company.—This is an Act of incorporation, with additional powers. The original company were established in 1824, and they were afterwards formed into a joint stock company, with a capital of £20,000, with power to raise on bond £5000, and to increase the share capital to the further extent of £15,000; but those powers have not been exercised. The share capital of the company, as fixed by the Act, is £40,000, to be divided into 4000 shares, with power to borrow £9800. The qualification of directors is the possession of 20 shares, and there are not to be more than seven nor less than five. Any number of shares under 8 give only one vote; 8, and under 15, two votes; under 20, three votes; under 30, four votes; and 30, or any greater number of shares, five votes. The quantity of land the company are empowered to purchase is not to exceed five acres. The maximum price of the gas is fixed at 4s. 6d. per 1000 feet. The company have power to sell their works to the corporation.

Stockton New Gas Company and the Stockton Gas Consumers' Company (Limited).—These companies are amalgamated by the Act passed on the 27th of July last, preparatory to their purchase by the Corporation of Stockton, according to an agreement dated the 27th of April. The capital of the amalgamated company is to consist, in the first place, of £16,000, of which £10,000 is to be divided into 800 shares of £12. 10s. each, to be called Class A shares, and the remaining £6000 to be divided into 600 shares of £10, to be called Class B shares. The Class A shares, which are to be considered fully paid up, are vested in the shareholders of the old company; and the Class B shares, of which only £6 are to be considered as paid up, are vested in the proprietors of the Consumers' Company; these amounts of £10,000 and £6000 representing the existing capitals of both companies. The United Company are empowered to raise an additional capital of £9000 by the creation of new shares to be called Class C shares, and to borrow a sum equal to one-fourth the share capital. The dividends paid on the A and B shares are limited to 10 per cent., and on the newly-created shares to 7½ per cent. The holder of £25 of nominal capital is entitled to one vote, and every additional £25 entitles him to an additional vote. The number of directors is to be reduced to seven at the first ordinary meeting of the company, the directors' qualification being the possession of £100 of nominal capital. The additional quantity of land the company are empowered to purchase is limited to three acres. The corporation of Stockton are empowered to purchase the works from the amalgamated company at any time before the 1st of December next; and it appears from an agreement, referred to in the Act and appended to it, that the purchase-money to be paid to the old company is to be £10,000, and the Consumers' Company are to receive a sum equal to the amount of all the money they have expended in their undertaking. The maximum prices of the gas are fixed at 5s. per 1000 feet within the borough, and at 6s. beyond, the quality being only 10 sperm candles. The Act came into operation on the 13th of August.

Stratford-upon-Avon Gas Company.—This Act incorporates the company formed in 1834. The capital of £3750, divided into 150 shares of £20 and into 150 shares of £5, is continued, with the power to raise additional capital by the creation of shares to the amount of £3000. The new shares are to be issued as preferential shares, with a maximum dividend of 5 per cent. The price of gas is to be 5s. 6d. per 1000 feet.

Sunderland Corporation Gas Company.—This Act gives additional powers, and alters the name of the company

to the "Sunderland Gas Company." The capital of the company is to consist of £190,600, of which £90,600 is to be distinguished as "original capital," and the remaining £100,000 as "additional capital." The prescribed rate of dividends on the original capital is 10 per cent., and on the additional capital 8½ per cent. The number of directors is never to be less than nine. Shareholders of £5 and less than £25 to have one vote; above £25 and less than £50 two votes; £50 and less than £150 three votes; £250 four votes; and above that amount five votes. The company are not to hold more than 15 acres of land. The maximum price of the gas of full standard quality is 4s. per 1000 feet.

Victoria Gas Company.—The company established for supplying Victoria Docks and the neighbourhood with gas is incorporated by the present Act. The capital of the company is to be £100,000, divided into 10,000 shares, with power to borrow £25,000. The qualification of the directors is the possession of 50 shares, and the number is limited to six. The company have the power to purchase the North Woolwich Gas-Works, and to extend them. The maximum price of gas for the first ten years is fixed at 6s. per 1000, to be reduced to 5s. at the expiration of that period.

Willenhall Gas Company.—The company originally established in 1834 is incorporated by the present Act. The total capital is to be £15,000, of which £5100 (the existing capital), together with £2754 capitalized from the revenue, are to be considered as paid-up shares, and are vested in the present holders. The latter sum is to be divided into 1020 shares, to be called Class B shares, and the holders are to be entitled to a fixed preferential dividend of 5 per cent. The company have the power to borrow £3750. The maximum price of gas is 6s. per 1000 feet.

The following summary shows at a glance the maximum prices of gas authorized by Parliament in the last session; the quality in each case, when not otherwise mentioned, being 12 sperm candles of six in the pound:—

		Per 1000.
Burslem	(ten candles)	5s.
Bury (Lancashire)		5s.
Chepstow		5s.
Cork	(ten candles)	6s.
Glasgow (suburban company)	ditto	5s. 6d.
Glasgow (old company)		5s. 6d.
Guildford		6s.
Shrewsbury		6s. and 7s.
South Shields		4s. 6d.
Stockton		5s. and 6s.
Stratford-upon-Avon		5s. 6d.
Sunderland		4s.
Victoria		6s.
Willenhall		6s.

The opinion of the Court of Queen's Bench is to be taken next term upon several important cases connected with the rating of gas and water works, embracing those of the Cambridge Gas-Works and the mains of the Chelsea Water-Works laying in Putney parish. The opinion of the Judges of the Exchequer Court is also expected to be pronounced with regard to the rule for a new trial applied for in the case of Hills *v.* the London Gas Company.

Correspondence.

RANSOME'S FILTERING SLABS.

Sir,—My attention has been called to a letter of Mr. G. R. Burnell's, which appeared in the last number of your Journal, on the subject of the application of my patent stone filtering slabs, as adopted for filtering the water for the town of Southampton. As this letter (although it bears unequivocal testimony to the value of my material as a filtering medium) contains allusions to what Mr. Burnell describes as "defective arrangements," which may convey to the minds of some of your readers an erroneous and unfavourable impression respecting the operation of these slabs, I feel it important that I should offer a few short remarks in explanation of the facts of the case.

The defects to which Mr. Burnell has adverted are all involved in the question of the *mechanical construction* of the reservoir in which the filtering slabs are placed, and in this I was in no way concerned. I was simply required to furnish slabs to cover a given area—capable of filtering at the rate of 100 gallons of water per superficial foot per diem—with an available head of water of not less than four feet; and I neither saw the plans nor the reservoir in question until some time after the slabs had been supplied, when I had occasion to visit the town of Southampton upon other business.

I took advantage of this opportunity to inspect the reservoir and filter-bed in company with the contractor for the work, to whom I expressed my regret at the apparent want of suitable provision for removing the sedimentary matter as it accumulated after its separation from the water, and also for the more thoroughly and effectively flushing the channels under the filtering slabs. Immediately upon my return to London I addressed a letter to the engineer of these works, drawing his attention to the above points, and expressing my apprehensions in reference to them. I have reason to believe that these matters had received his attention, and would have been provided for; but, having shortly afterwards received a government appointment, he retired from the office he had held, and the works were completed in accordance with the original plans which were designed before the adoption of my patent stone filtering slabs had been determined upon.

From the foregoing statement, I think it will be plain to your readers that I deserve no credit for the arrangements of the works, nor am I in any way responsible for the apparent defects of construction. The efficiency of the filter slabs has been abundantly and most satisfactorily established; and it cannot be matter of surprise to any practical man, if after two years' incessant working—during which time the slabs have performed so largely in excess of the maximum quantity they were ever expected to do—with water, which at certain seasons contains a very large amount of extraneous matter, it should be found necessary to take some steps fer the removal of the sedimentary deposit so separated from the water which has been allowed to accumulate.

Ipswich, Oct. 20, 1857. Frederick Ransome.

Register of New Patents.

882.—Jean Eugene D'Arcet, of Paris, chemist, for "*Improvements in distilling and rectifying tar, resin, oils, turpentine, bitumen, and other matters, and in the apparatus for the same.*" Patent dated March 31, 1857.

This invention has for its object to obtain continuity of action in the distillation of tars, turpentines, resins, bitumens, oils produced from schists, and all analogous substances; as also in the rectification of divers oils or essences produced from the said matters, and generally from all hydro-carburetted liquids or substances that may be liquified by means of this process: the several volatile products capable of being produced by distillation from the above-mentioned substances can be separated if required. For this purpose, in the apparatus hereinafter described, if the substance is a solid resin, for instance, it is first liquified by heat. The feed-pipe conducts it into a vessel, the form of which is preferred to be cylindrical, closed and furnished at its parts, receiving heat with metal sufficiently fusible (lead, for example, or a metallic alloy), so that the temperature to which the substance to be distilled or rectified shall be nearly constant, and unable to be raised rapidly. The liquid traverses the vessel in which the metal or alloy is placed. The metal or alloy is chosen so that its degree of fusion may be rather higher than the temperature for the volatilization of the products desired to be obtained. The liquid to be distilled or rectified enters at one end of the vessel; the vapours produced escape at the upper part, while the residue from the operation is drawn off at the other end of the vessel.

When it is desired to separate the several volatile products the one from the other, instead of one vessel several vessels are employed, communicating one with the other, each having metals or alloys fusible at different temperatures.

The vessel which the liquid passes into first is the least heated, from which the most volatile product escapes; in passing from the first, the liquid enters a second vessel, more highly heated than the first; and it is from this vessel that another volatile product escapes, but less volatile than the first: and so on, through a number of vessels, varying according to requirements. The vessels are placed near to or distant from the furnace, according to the greater or less heat required to volatize the matters to be operated upon.

The operation can be conducted in a continuous manner without the necessity of the vessels having a fusible metal, if the temperature does not exceed the proper degree (640° to 850° Fahr.); the interposition of the fusible metal is, however, preferable.

A jet of steam may be directed into the several volatilizing vessels to facilitate the departure of the volatile products therefrom.

The form and arrangement of the apparatus may be varied; for instance, instead of a number of vessels, a single vessel may be used, with compartments formed by partitions, so that the liquid may pass from one compartment to the other.

The chief feature or aim of the invention, and in the use of the apparatus, is to obtain a continuous distillation analogous to the distillation of alcoholic liquids, and, at the same time, to heat the substances to be distilled as little as possible. This process is based—

Firstly, on the continuity of the operation of distillation or rectification; secondly, on the spontaneous separation of the volatile products arising from these operations.

In order to attain such a result, the substances, naturally liquid or liquified by heat when they are solid at the common temperature, are subjected to temperatures more and more elevated, until they attain the utmost temperature to which the substances in question are required to be brought under for the purposes required.

By obtaining such a succession of increasing temperatures, the liquid or liquified substance is caused to pass through a succession of compartments in the same vessel, disposed in such a way that their temperature may be

successively more and more elevated: so that the substance evolves, in the first vessel or the first compartment, its more volatile parts, while its less volatile parts are evolved in the next vessel or compartment, so that it is easy to collect them separately without changing the recipient in the progress of the operation, as it is now a necessity to do when the desire is to obtain such a separation.

Each vessel or compartment is supplied with an orifice through which the vapours evolved in the said vessel are allowed to escape. This orifice is connected with a worm, wherein the vapours are condensed.

The liquid or liquified substance enters the first vessel or compartment through a suitable opening, and the last one is provided with a discharging pipe through which the residuum of the substance, whose volatile parts have been extracted, flows out.

The number of the vessels or compartments may be varied according to the subdivisions required of the volatile productions.

Such is the general principle of the process. Several pieces of apparatus are suited to establish the working of this process, which may, however, be quite independent of any apparatus whatever.

The claim is for, first, the distillation and rectification of the substances hereinbefore mentioned, by the means or process and in the manner hereinbefore described; and, further, for the apparatus as described, applied to such purpose of rectification and distillation, or any mere modification of the same.

903.—Lambert Perin, engineer, of No. 2, Rue Barbelle, Paris, for "*The easy discovery of flaws and escapes in gas-pipes.*" Provisional protection only obtained. Dated April 1, 1857.

It is a tightly-closed vessel of copper, glass, or other suitable material, attached to and communicating with any range of gas-pipes by means of a tube and a curved glass pipe, partially filled with quicksilver or other suitable fluid, one arm of which pipe is affixed to and communicates with the same gas-pipe to which the vessel or receiver is joined, and the other arm left open.

This apparatus will act as a test upon the state of the gas-pipes (that is to say, as to whether they have any communication with the outer air, through any crack or hole, or by any tap left open, or the contrary), by means of heat applied to the receiver after the tap connecting the pipes to be examined with the meter or main has been closed. The heat will, in a short time, rarify and expand the air or gas contained in the receiver and pipes, and cause such air or gas to rush with considerable force from any opening that may exist in any of the pipes connected with the receiver. If no such opening or escape exists, the expanded air or gas will press upon the quicksilver in the glass pipe, and cause it to rise in that arm open to the outer air.

Another test may be applied by condensing the air or gas in the pipes by cooling the receiver; such condensation will cause a void, which will at once be filled by the outer air through any opening, however small, which may exist in the pipes; or, no such opening being present, the pressure of the outer air upon the quicksilver in the glass pipe will cause it to rise in the arm attached to the gas-pipes under examination.

It is not absolutely necessary that the curved glass pipe and quicksilver should be the only indicator used with the aforesaid receiver; a substitute may be found in the form of a common ventilator-wheel, such as is used for windows, which is attached to and connected with the gas-pipes, and which will be turned alternately either one way or the other, as the pressure from inside or outside is the greater.

953.—James Hansor, of Barnes, in the co. of Surrey, practical chemist, for "*Improvements in apparatus for consuming gas.*" Provisional protection only obtained. Dated April 4, 1857.

This invention relates, firstly, to a mode of adjusting the supply of air to argand gas-burners to suit various pressures and qualities of gas. To effect this object, the deflector is mounted loosely on a central stem which stands up from the arms of the burner; and this stem is tapped with a coarse thread to receive the deflector, and to permit of its being raised and lowered as desired. By this means the chamber of air formed by the cylinder of flame and the deflector may be enlarged or reduced, and so to determine the supply of oxygen to the exact amount required to ensure the perfect combustion of the gas. The under side of the deflector is proposed to be made bright either by using a polished surface of metal, or an enamel that will stand the action of heat.

In order to facilitate the adjustment of the gas-cock to the requirements of the consumer, or the capacity of the burner, a pointer is applied thereto, and an index attached to the supply-pipe, by which means the attendant will be enabled to adjust the cock of the burner to any required position, and thus ensure a proper supply of gas thereto.

888.—Frank Clarke Hills, of Deptford, in the co. of Kent, manufacturing chemist, for "*Improvements in manufacturing gas, and in apparatus connected therewith.*" Provisional protection only obtained. Dated March 31, 1857.

In the ordinary mode of manufacturing gas, large quantities of smoke and impure gases escape from the retorts into the retort-houses, and from thence into the outer air, and the object of this improvement is, as far as possible, to prevent such escape, and to keep the retort-houses as cool and free from smoke and impurity as possible.

The nature of the improvements will perhaps be best understood by showing the difference between them and the ordinary mode of working. In drawing coke in the ordinary manner from the retorts, some of the coals are not properly converted into coke, and tar is deposited in the mouthpiece or upon the door, and the admission of air causes a good deal of smoke and impure gas to escape. The same escape takes place when the retort is charged, also in clearing the ascension-pipe by a hot iron or otherwise, which smoke and impurity escape into the retort-house.

The first object proposed to be effected is to prevent, as far as possible, this escape of smoke, &c.; and this is effected by placing a hood in front of the mouthpiece of each retort, which hood rises a few inches above the top of the retort, but having its front as low, or a little lower than the inside top, so as to form an inverted box or pocket to receive the smoke, &c., which may escape from the retort. The sides of the hood should come down as low as the bottom of the retort. At the upper part of the hood (which may be made of cast or wrought iron, of any convenient form) a pipe is placed (of sufficient capacity to take off all the smoke, &c., which is generated) to connect the hood of the flues or fireplaces of the bed of retorts. This pipe is to be furnished with a valve or slide, to open or close the connexion between the hood and the flues at pleasure. The ash-pit of the furnace heating the retorts is to be furnished with a door, and each retort, or bed of retorts, is to have a damper, to regulate the draught into the main flue of the chimney. These matters being thus arranged, when the retort-house is charged or uncharged, the valve of the connecting-pipe from the hood to the flues is to be opened, as well as the damper, into the main-flue, and the ash-pit door is to be closed. By this means a sharp draught will be caused through the hood and connecting-pipe, which will draw any smoke or impure gases which may escape from the retort into the red-hot flues, where they will be burned or consumed. After the retort, or bed of retorts, is charged, the valves of the connecting-pipes from the hoods are to be closed; the damper of the main-flue is also to be closed to the ordinary working draught, and the ash-pit door is to be opened. If enough draught can be obtained without closing the ash-pit or altering the damper to the main-flue, then there will be no necessity for these points being attended to; but in most cases it will be best to work as above indicated. Instead of connecting the hoods to the flues or fireplaces of the beds of retorts, they may be connected to a separate flue leading to a chimney that has sufficient draught; or sufficient draught may be caused by revolving fans, or other mechanical means, to draw the smoke and gases from the retorts, which said smoke and gases may be afterwards passed into a chimney or condenser; but taking the smoke, &c., into the flues of the retort-beds is preferred.

The next object is to prevent tar or tarry matter from being condensed or deposited in the mouthpiece of the retorts, as it usually is in the ordinary way of working, and which, coming in contact with the hot coke drawn over it from the retorts, causes much smoke, &c. This is prevented to a great extent, if not wholly, by having the bottom of the mouthpiece of the retort made to slope inwards from the door to the red-hot part of the retort, so that any tar that may condense in the ascension-pipe or mouthpiece will run down the inclined plane from the door to the red-hot part of the retort, and be converted into coke or cinders. The mouthpiece being thus free from tar, little or no smoke will be made when the hot coke is drawn over it. A gutter, or inclined plane, may also be fixed to the door of the retort under the ascension-pipe to carry any tar that may drop into it to the red-hot part of the retort, and the ascension-pipe should project a little into the inside of the mouthpiece to deliver the tar into the gutter or inclined plane without running down and contaminating the inside of the mouthpiece. Any tarry matter, however, remaining in the mouthpiece of the retort when the door is opened, should be absorbed with a little fine breeze and dust, and be scraped out before withdrawing the coke. The mouthpiece of the retort should be kept as hot as it can be worked without causing a stoppage in the ascension-pipe, and this may be effected by lining the mouthpiece, either inside or out, with brickwork.

The last part of the improvement is to cool the coke with lime water instead of common water, which will, to a considerable extent, prevent the escape of sulphuretted hydrogen and sulphurous acid gas which takes place when common water is used.

992.—Jasper Wheeler Rogers, of Peat House, Roberts Town, in the co. of Kildare, engineer, for "*Improved means of, and apparatus for, collecting for use the excrement of towns and villages, and for facilitating the drainage of houses generally.*" Patent dated April 8, 1857.

The chief object of this invention is to collect and utilize the night soil, which is now discharged by the house drains of large towns and cities into the main sewers, and then passed over into an adjacent river, whereby the stream is polluted and the night soil is wasted.

In carrying out the above object, it is proposed to insert in the existing sewers cast-iron or other air-tight pipes of any suitable capacity, and to connect them with the pipes which lead from the several houses in their route to the sewers. These air-tight pipes, which the patentee calls the "house refuse mains," are to be led to a large chamber or receptacle built near the mouth of the sewer, in order that they may discharge their contents therein. This chamber is to be built air-tight; and when placed on a tidal river it is to be provided with a series of discharge-pipes for running off at different levels or states of the tide the liquid parts of the house drainage, after they have passed through a filtering bed also contained in the chamber. A lift-pump is also fitted up in the chamber as well as an air-pump, and an archimedean lift is likewise applied for the purpose of raising the solid matters, and discharging them into proper receptacles, as required The house sewerage, when it enters the chamber, will fall to the bottom, and the fluid portion will, as the pressure accumulates, pass upwards through a filtering bed of peat charcoal, by which it will be deprived of its ammoniacal and other noxious properties. The water will then pass off by discharge-pipes in a pure limpid state, leaving a valuable deposit in the chamber.

When the solid matter has sufficiently accumulated, it is lifted by the archimedean screw—the pipe in which the screw works being pierced to ensure a thorough drainage. The water also may, when required, be discharged by means of a lift or force-pump.

In order to keep the house mains clear, and to prevent the possibility of a discharge of deleterious gases into the houses from the mains, it is proposed from time to time to employ atmospheric pressure to assist in discharging the mains. To this end a vacuum, or partial vacuum, is formed by the aid of the air-pump in the large chamber or receptacle, having previously, by means of valves, shut off the connexion between the mains and the chamber. When the expansion is sufficient, the valves are opened, and the discharge of the main will immediately take place; the pressure of air behind any obstruction causing the instant displacement of the same, and driving it forward into the chamber.

By this arrangement it will be understood that no interference whatever takes place with the discharge of the surface drainage, which is effectually prevented from becoming mixed with the night soil, thereby rendering the utilizing of that substance as a manure a very simple and profitable operation.

The apparatus proposed to be employed is as follows. At or about the

lower extremity of the vertical pipe of water-closets a chamber, constructed as shown in the drawings, is placed, in such a position that it can be conveniently got at for examination and use. This chamber is furnished with a shaft, with cross-arms at 1½, 2, or 3 inches asunder, forming a grating across the chamber when it is stationary, so that extraneous or foreign matter or thing thrown into the closet beyond the size of the opening or grating cannot pass through, whilst the soil and water and paper will have sufficient space for that purpose. A lever handle is attached to the shaft, so as to give the power of setting it in motion by hand from the outside; and, if it be found that any stoppage has taken place in the pipe or chamber, the handle is used to make the cross-arms on the shaft traverse round the chamber, by which means any slight obstruction, such as the clogging by paper, &c., will be removed or broken up, so that they may pass away; the breaking up of such matter being caused by the arms passing through a grating attached to the side of the chamber, standing in an angular position, which angular grating will hold at its upper side any other matter which is not sufficiently small to be forced through it by the action of the revolving arms round the shaft. If it be found that the lever handle has not power to force the arms round, the chamber must be opened, which is done by simply unscrewing a couple of thumb-screws, or other similar convenient arrangement, by which the side is detached, and the obstruction within removed. By this means the chance of stoppage in the pipes intended to carry away the excretory matter from closets will be considerably lessened, and the inhabitants of houses have the power of removing obstructions caused by the carelessness of servants, &c., without seeking for the aid of plumbers, &c.

The vertical pipe below the chamber is connected with an inclined pipe, made of any sufficiently strong and air-tight material—metal, iron-stone, earthenware, &c.—and running from the house to a pipe or main drain to be placed in all the existing sewers, and which pipe is to be also made of any sufficiently strong and air-tight material, and is designated the "house refuse main." The diagram attached to the specification represents a street in cross-section, and displays the ordinary main sewer, with the proposed "house refuse main" in the centre, supported by brackets, in such a position as not to interfere with the flow of the surface water and the discharge from the kitchen drains of the houses. With this house refuse main all water-closet pipes should be connected, by which means no excretorial matter would be discharged into the general sewer, and all the evil now experienced from the collection of sewerage matter in the sewers, and the discharge from it of noxious gas, so destructive to human life, would be prevented. These pipes, or "house refuse mains," should be made of such dimensions as would be proportionate to the quantity of matter to be passed through them; and they should be concentrated (according to circumstances and the natural fall or water-shed of the locality), by degrees, into one main discharging at the principal sewer-mouth, wherever it might be; the length of pipes, or house refuse mains, discharging at one point being regulated by the nature of the locality to be drained. The joints should be of such a construction that the pipes could be readily disconnected, and made air-tight when connected again.

At the point of discharge is placed a chamber, which is designated the "filtering vacuum chamber," and which is constructed of cast or wrought iron plates bolted together, and sufficiently strong to resist atmospheric pressure from without, whenever it may be found necessary to produce a perfect or partial vacuum therein, and of a size proportioned to the quantity of matter and water to be passed into and through it. Into this chamber is discharged the whole contents of the house refuse mains, at such a level as would be found suitable to the rise and fall of the river into which the main sewer empties itself. Within this chamber is constructed a filtering bed composed of peat charcoal (prepared according to patentee's special process of manufacture), or peat, mould, ground peat, and broken cast-iron, the whole disposed in layers or beds, in such quantities or proportions as would be suitable to the extent of sewerage-water to be passed through it. The water and matters from the house refuse, and the weightier solids which naturally precipitate towards the bottom, and the liquid rising to its own level, would pass up through the grating, and traverse through the filtering bed, rising up a second grating, or a water and pump shaft, and discharging itself through one or other of the tide-valves, according as the river-water would allow, the number of tide-valves being regulated according as found desirable for the locality. Thus the filtering bed would prevent the passage of any solid matter, and absorb (by means of an affinity existing between the preparations of peat-moss described, and the impurities existing in the sewerage) that most injurious noxiousness which is now imparted to rivers by the discharge of sewerage matter into them.

The tide-valve is specially constructed so as to prevent the admission into "the filtering and vacuum chamber" of exterior water. In form it something resembles the port-hole of a ship, but is hinged from below, and rises upwards to a close—the hinge being made water-tight by an indiarubber covering—and at each side are quadrants, which work in a close groove formed in the framing into which the valve shuts, the effect of which is, that water cannot enter at the sides of the valve when open, but must pass over the valve-front or door, hung, as before stated, on a hinge below. On this valve-front or door is secured a float, for the purpose of causing the water as it rises from without to lift the valve and keep it floating on the surface. Thus, as the water rises, the valve closes, and becomes perfectly water-tight by the lateral pressure from without; whilst, when the water commences to fall, so does the valve, allowing the water from within to pass away. By this means water cannot enter the filtering chamber from without, inasmuch as its area is, in all instances, to exceed the area or contents of the whole extent of house refuse mains discharging into it. It will be found that the quantity of liquid matter usually to flow from water-closets will never exceed or equal the space provided in the filtering chamber for its reception and storage till the fall of the tide permits its discharge; therefore there cannot be any evil suffered, as now, from the return of sewerage matters by the rising of the tide.

All the foregoing evils being guarded against, the only possible danger to be apprehended is the stoppage of the "house refuse mains" from any cause. This is provided for as follows:—The "filtering vacuum chamber" is, as before stated, to be of dimensions sufficient to exceed the areal contents of the "house refuse mains" discharging into it; and a steam-engine of sufficient power is provided, which works an archimedean screw for the purpose of lifting the solid matter collected in the bottom of the chamber and discharging it into a receptacle above. This receptacle forms part of a machine situated on the floor of the shed or building erected upon the vacuum chamber, and its office is to intermix and at once convert the whole matter into a comparatively dry and inodorous manure, capable of being removed by any species of conveyance without inconvenience or giving out smell in the slightest degree. This being intended to be a continuous process during the day, the solids will never accumulate, and, whenever it be found that stoppage has taken place, or if it be considered desirable, the following process can be effected at low water in the case of tidal rivers, or at any stated time in others—say every 24 hours.

The solids having been lifted up as described, the pump will speedily remove whatever water may remain in the chamber to give an ample space for vacuum. This being done the air-pump will, by means of the engine, withdraw the air, the ingress and egress passages or valves being first securely closed; and when the vacuum has been attained, the ingress valve will be opened, when, at the same instant of time, the whole contents of the mains, whether liquid, solid, or gaseous, must commence to move from end to end of the pipes towards the vacuum, and continue to do so until the space be entirely filled again. Thus stoppages in the mains will be, in fact, impossible; and inasmuch as that the matter discharged into the mains will not be subjected to the action of the atmosphere during its retention in them, noxiousness within the pipes will be totally prevented, and none of the gaseous emanations from night soil, which now produce such damage to the health of towns and villages, will in future exist.

The claim is for—

1. The separation, by means of closed pipes placed in the existing sewers, of the excretory matter discharged from water-closets, and its preservation thereby in its almost original state.

2. The removal, by means of a vacuum produced in a chamber in the manner described, or by any other analogous means, of stoppages in drainage or sewerage pipes.

1027.—THOMAS WILTON, of Eastbourne, in the co. of Sussex, gas engineer, and JOHN HUGGETT, of the same place, engineer and smith, for "*An apparatus for regulating the flow or supply of gas.*" Provisional protection only obtained. Dated April 11, 1857.

This invention consists of an apparatus to be applied to every burner, or to a series of burners, which, according to the pressure at the gas-works, will admit, at a small pressure (say, for instance, the ordinary day pressure), of a minimum supply to the burner, just sufficient to keep a light, and which, on the full evening or night pressure being applied, admits of the flow of sufficient gas to keep the light at the full extent required.

The main object of the invention is to prevent the necessity of turning on and off gas to street lights; and, during the hours when the lights are not required, a minimum quantity only flows through the apparatus. This operation is effected by diminishing the pressure at the works, or elsewhere, whereby a valve in the apparatus closes, and only admits gas through a very narrow tube or orifice. On the full pressure being applied, the pressure opens the valve and admits the full supply of gas to pass through it to the burner. Under no circumstances is the gas ever completely extinguished when the apparatus is in action.

PROVISIONAL PROTECTION

HAS BEEN GRANTED FOR THE UNDERMENTIONED PATENTS.

1938.—HYPPOLYTE LAURY, of Paris, and of 45, Essex Street, Strand, London, for "*An engine or apparatus for obtaining motive power by an improved method of applying steam, gas, or heated air.*" July 11, 1857.

2506.—WILLIAM EDWARD NEWTON, of 66, Chancery Lane, civil engineer, for "*Improved apparatus for igniting gas or other lamps.*" Sept. 29, 1857.

2518.—JAMES HARRIS, of Hanwell, in the co. of Middlesex, engineer, for "*Improvements in, and connected with, cocks and valves, especially adapted to preventing the bursting of water-pipes from frost.*" Sept. 30, 1857.

2529.—JOHN SWEET WILWAY, of the city of Bristol, gas engineer, for "*An improved apparatus to act as a gas-valve.*" Oct. 2, 1857.

2543.—JOHN STOBBS, of Sidney Street, North Shields, and GEORGE ROGER HALL, of Linskill Street, North Shields, in the co. of Northumberland, for "*Improvements in pumps for raising water and other liquids.*" Oct. 3, 1857.

2557.—RICHARD HUGH HUGHES, of Hatton Garden, London, manufacturer, for "*Improvements in hydraulic connexions of gas chandeliers, lanterns, or pendants.*" Oct. 6, 1857.

2562.—JAMES STONEHAM, of Audenshaw, near Manchester, and JOHN PIPLER LEES, of Ashton-under-Lyne, for "*Improvements in uniting or connecting piping.*" Oct. 6, 1857.

2564.—WILLIAM KNAPTON, of the Albion Foundry, Monkbar, York, for "*Improvements in gasometers or gasholders, and in the application thereof to railway and other carriages, and ships, for lighting the same with gas.*" Oct. 6, 1857.

2584.—JAMES WADSWORTH, of Hazlegrove, near Stockport, in the co. of Chester, machine maker, for "*Improvements in the production and management of artificial light and heat, and in certain parts of apparatus applicable thereto.*" Oct. 8, 1857.

2587.—FENNELL HERBERT ALLMAN, civil engineer, of Mornington Place, Regent's Park, London, for "*Certain improvements in the construction of valves and taps.*" Oct. 9, 1857.

NOTICES HAVE BEEN GIVEN OF INTENTION TO PROCEED WITH THE UNDERMENTIONED PATENTS.

1555.—JAMES STEVENS, of the Darlington Works, Southwark Bridge Road, for "*Improvements in water gas-meters.*" June 2, 1857.

1626.—MAXWELL MILLER, of Glasgow, N. B., brass-founder, for "*Improvements in cocks, taps, or valves.*" June 10, 1857.

1655.—EUGENE BARSANTI, professor of physics and mathematics, and

FELIX MATTEUCCI, gentleman, both of Florence, Tuscany, for "*Improved apparatus for obtaining motive power from gases.*" June 12, 1857.

1722.—WILLIAM WRIGHT, of Sheffield, in the co. of York, plumber, for "*Improvements in flushing apparatus applicable to cisterns and water-closets.*" June 20, 1857.

2507.—WILLIAM EDWARD NEWTON, of 66, Chancery Lane, London, civil engineer, for "*Improved apparatus for measuring gas.*" Sept. 29, 1857.

Miscellaneous News.

METROPOLITAN BOARD OF WORKS.

WEDNESDAY, OCT. 14.

The Adjourned Special Meeting of the Board, for the purpose of considering the communication from the First Commissioner of Works, relative to the main drainage of the metropolis, was held this day in the Guildhall—Mr. THWAITES in the chair.

Mr. CARPMAEL said, as there were some questions to be put by Mr. Wright, he would suggest that they be asked before he addressed himself to the general question. He would himself ask whether Mr. Bazalgette had received any communication from Mr. Simpson in answer to the important applications he had made?

Mr. BAZALGETTE: I have not received any farther communication.

Mr. CARPMAEL would ask also, if Mr. Bazalgette had been able to make out, from the plans and sections, whether the referee engineers proposed to have gates at the lower outfalls or not?

Mr. BAZALGETTE: They make no statement, and show nothing of the kind on their plans.

Mr. H. L. TAYLOR objected to the course suggested by Mr. Carpmael. They were met to consider the communication of the First Commissioner. He wanted that communication to be read. Then they would be in order.

The CHAIRMAN: Does the honourable member mean the report of the referee engineers, or the letter which was sent by the First Commissioner?

Mr. H. L. TAYLOR: The letter from the First Commissioner.

Mr WOOLRYCH then read the letter, signed by Mr. Russell, assistant secretary to the First Commissioner.

Mr. H. L. TAYLOR should like to direct the attention of the board for a moment to that communication. Sir B. Hall had sent to the board the result of an investigation made by three eminent engineers upon the whole question of the drainage. Ought they not to require from Sir B. Hall his opinion of the scheme propounded by those three engineers?

The CHAIRMAN: We cannot raise that discussion.

Mr. WRIGHT said he had given notice of a question to be asked of the engineer. Through some misapprehension in the notice, the question was misprinted. He should put it in a shape that would be intelligible—in fact, in the shape of two questions Is it the fact that the sewer proposed by the Government engineers, which empties itself at Mucking Creek, or somewhere about that point, will be tide-locked for a considerable period of every tide?

Mr. BAZALGETTE: That is so.

Mr. WRIGHT: It also discharges sewerage at low water?

Mr. BAZALGETTE: Yes; so far as can be gathered from the sections.

Mr. WRIGHT: Suppose the sewerage were discharged at low water, how many miles up the river would that sewerage flow at the next high tide?

Mr. BAZALGETTE: Based upon Mr. Foster's float experiments, it would rise nearly twelve miles.

Mr. WRIGHT: And is it not a well-ascertained fact, that at spring tides, according to the float experiments, the sewerage would be carried still higher up the river?

Mr. BAZALGETTE: Yes.

Mr. WRIGHT: How high would it flow at the highest spring tides, immediately after being discharged at low water?

Mr. BAZALGETTE: Based upon the same experiments, it would flow up to Woolwich Reach, about half a mile above Barking Creek, and about a mile and a half within the metropolitan area.

Alderman HUMPHREY: Supposing it is a north-east wind, how far would it come up?

Mr. BAZALGETTE: There are no experiments to show.

Alderman HUMPHREY: Up to London Bridge.

Mr. WRIGHT: Supposing there were no rain, how long would it take the sewerage to pass from one end to the other of the proposed open sewers?

Mr. BAZALGETTE: The length of these open canals being about eighteen miles, and the rate of flow being assumed to be something more than a mile and a half an hour, it would be about twelve hours.

Alderman HUMPHREY: Would it ever empty itself? Will there be locks at the other end?

Mr. BAZALGETTE: There is nothing to show.

Alderman HUMPHREY: Where is the sewerage to be at low water?

Mr. BAZALGETTE: From the sections it is not apparent whether the tide would flow into the sewers.

Alderman HUMPHREY: Then the sewerage may be always flowing?

Mr. BAZALGETTE: There is no information on that point.

Mr. CARPMAEL: I would ask the engineer whether, according to their statement, it would not flow up 13 feet above the invert at low water?

Mr BAZALGETTE: Yes. The invert at the sewer would be something like 13 feet. There are two points upon which I did not give information in my answers to Mr. Wright's questions, which I should be glad to clear up before we proceed. At page 44, the Government engineers state that the outfall at B* is objectionable for one reason—because it would have a deleterious effect upon the health of the district. Now, in the tidal canals, the Government engineers propose to have six measures of water to one measure of sewerage; but at the point B* in the river Thames there would be 143 times more measures of water to one measure of sewerage. Consequently, if sewerage discharged at B* would be deleterious to health, it would be 143 times more so in the sewerage canals. Again, I have proposed to have two covered reservoirs at B*—one to be covered 10 acres, and the other 4½ acres. But the sewerage canals would expose upwards of 150 acres of uncovered evaporating surface. Consequently, I apprehend they must be more deleterious to health than the mode proposed by B*. Again, they say it would be prejudicial to the navigation, and they explain that at page 28 of their report, by saying—"With respect to this locality, if a stream laden with sediment be poured into the river, the sediment will have a tendency to deposit and form into shoals, &c." These gentlemen have laboured very carefully to show what is a strong current—that is, what is the rate of flow sufficient to remove that deposit; and they put it at 2½ feet per second. Now, it is well known that the maximum flow of the river Thames is about 3 miles an hour. Two and a half feet per second give 1¼ miles per hour.

Mr. LESLIE: Not so much; it is 1·7 miles.

Mr. BAZALGETTE: Therefore, if a stream flowing at the rate of nearly 1¼ miles per hour will wash away oyster-shells, surely the river Thames, which flows at the rate of 3 miles an hour, will carry away heavier things.

Mr. LESLIE: That is not quite their meaning. Their meaning is, that Erith Reach is of a particularly shoally nature; it has been a trouble to the navigation of the river for more than a century; and their point is, that the sediment depositing at B* would endanger the navigation of the Thames by an increase of the shoals at that point.

Mr. BAZALGETTE: My answer is, that Erith Reach is not the point selected by me. It was selected by Captain Burstal, and marked as the plan here by Sir Benjamin Hall's own hands. At the same time I am of opinion that whatever deposit is brought down by these sewers with a sluggish current, and turned into the main channel of the river with a more rapid current, will be carried away from that Reach. The deposit which takes place on these shoals is of an entirely different nature: it consists of close sand, which is more difficult to remove than deposit brought down from sewers.

Mr. TURNER: When you say that the B* sewerage will be mixed with 143 times its own bulk, do you take the capacity of the river at high water?

Mr. BAZALGETTE: It is 718 times its own bulk. The Government engineers propose to dilute it with 6 times its bulk. The B* plan dilutes it with 718 measures of water, which is 143 times greater than according to their plan.

Mr. TURNER: Is that at high water?

Mr. CARPMAEL: At the time the sewerage flows out. It is now my duty to endeavour to convince the board that the proper course for them to take is to refer the whole of their plans, and the plan of the referee engineers, to two eminent civil engineers. I have named two, as a matter of course (Messrs. T. Hawksley and George Bidder). It will be for the board to determine what two they shall be if they agree with me in the principle. I am indifferent about names. I have named two, because they have never been called in with reference to the sewerage of the metropolis, and they are both largely engaged in all classes of work of the kind in other parts of this kingdom, and in various parts of the continent. Now, sir, the Chief Commissioner has returned the plan B*, together with a report prepared under his directions by three eminent gentlemen, and he has asked this board, by reason of the eminence of these gentlemen, to well consider the report. As a matter of course he has returned the plan B*, because he must have felt that till we had the whole subject again before us we could not deal with the plan of these eminent gentlemen. It would appear at first sight, by reason of these gentlemen disagreeing with the report of the board, that the board had not arrived at a wise and proper conclusion upon the subject. But in order to ascertain the value of the propositions of these civil engineers, it is desirable to see first wherein they differ from the board. They start with stating that they have based their plans upon the same principles as the engineer of this board has done his. (Hear, hear.) They go further: they say that no other principle can with propriety be used in carrying out this great work. Therefore, this board is justified as to the principle of construction—only, they say, "subject to the suggestions and variations that we have propounded." They approve of having a high level sewer on the north and south sides of the Thames, as recommended by the engineer of this board. They also agree as to the want of two middle level sewers, but they propose to vary the direction of them, in order to get the benefit of draining a larger area by the simple act of gravitation, and not by mechanically lifting the sewerage at any part of the course into the Thames. They agree in exactness as regards the low level sewer on the Surrey side; but they differ as to the propriety of having a low level on the north side of the Thames; and they propose to carry the sewerage of the western district across the Thames at Battersea, and to pump it into a sewer, so that it may then arrive at the Thames by gravitation. They have not gone practically into the question of how they are to dispense with this low level sewer, nor how they propose to deal with the sewerage between Lincoln's Inn Fields—which they say is about the level of their new sewer—and the Thames. I know no other way of dealing with it than by having a low level sewer. With this exception, then, the Government engineers and the engineers of the board are agreed. We must not feel that, in sending back the plans, Sir B. Hall disagrees with them *in toto*, because his engineer does not do that. On the contrary, I shall have occasion to show that the plans of the board have come back stamped with a degree of credit that I believe no engineering plan of like dimensions ever received before. (Hear, hear.) I can prove it out of the report which comes from the referee engineers; but I will delay that till after I have dealt with the plans of this board. Now, our plan has been dealt with in a great variety of ways by the public—in every shape and form that it is capable of being dealt with. We are not only supported by the referee engineers, as to the principles upon which we have acted, but we start with the support of civil engineers who were commissioners of sewers on a former occasion. We have the names of Mr. Frank Foster, Sir W. Cubitt, and Mr. Stephenson in support of all the principles that we have acted upon. Now, I would beg to remind you that, with the exception of Messrs. Galton, Simpson, and Blackwell, there is not one single man of eminence that has ever given an opinion which will support the proposition which those gentlemen are now making. I ask this board, is it prepared at the present moment to accept the engineering propositions of Messrs. Galton, Simpson, and Blackwell? I sincerely believe that there is not a man here present who is prepared to take scarcely a portion of that report; certainly not the grand scheme upon which the whole turns, viz., the open outfall sewers. I believe there is not an individual here that would support that being carried out under any circumstances. Then, if this board is not prepared to accept the referee engineers' plan, is it prepared to take the responsibility, without engineering knowledge individually, to reject that plan? I should say, certainly not. It comes to you from the First Commissioner of Works with a request, and a very proper request, that this board would take it into consideration, not because he approves of it himself. He gives no opinion one way or the other. In this he is perfectly correct, because he has no right to hamper the board by any pressure intimating what he wishes to be done. He ought to have no wish but to procure the best scheme to carry out this national undertaking. I feel, then, that we ought to take the plan into consideration at once, and deal with it in some practical shape or other. Are you prepared to say that you are willing to give up the plans that you have sent up to Sir B. Hall? I am certain that a large majority of the board will be inclined to hold to the plans of their engineer, and still more so when I come to examine the report of the referee engineers. I will assume, for the present purpose, that you have all looked through the report to an extent sufficient to enable you to follow every observation which I have to make, without my reading extracts from the report itself. Now, the great differences which the referee

engineers propose are these:—All their propositions are based upon the success of one portion of their plan, and that is, the possibility of having an outfall sewer 18 miles long, with a fall of six inches per mile. The whole is based upon that, because, if they cannot carry out that portion of their plan, then that part which relates to the larger area of gravitation, and that which relates to the collecting of a larger rainfall, must fall to the ground. It is, therefore, with reference to that question—whether that outfall sewer can be carried out or not—that I wish particularly to call your attention. The proposition is this:—They say that if you will have on each side of the Thames an open cutting, which they call an outfall channel, 38 feet wide and 16 feet deep, you will be able to carry down an enormous amount of sewerage and rainfall to Sea Reach, or the locality immediately at Sea Reach. Their report is exceedingly meagre when it comes to practical facts. (Hear.) It is voluminous enough—(laughter)—with respect to collected information, which anybody with industry might have collected without their aid. I asked the engineer just now if he had been able to ascertain from the report, plans, and sections, whether these getlemen intended to have gates at the ends of the outfalls. Personally, though I had read and re read, examined and re-examined, every part of their report, and all their plans and sections, I was not able, and am not able, to tell you whether there are to be gates at the outfall ends of the sewers or not. But they do tell us certain things, and upon those certain things I propose to form certain arguments. In the first place, they tell me—and I have had a fore-shortened diagram made in order to show what the real thing is—they tell me that they are to have at Woolwich a cutting. The top of that cutting is to be level on one side with Trinity high-water mark, and on the other side the cutting is to be 6 inches above Trinity high-water mark. They are then, their report says, to have a cutting leading to Sea Reach, which is to have a fall of 6 inches per mile. But strange to say, when they come within four miles of Sea Reach, they drop it at the rate of 1 foot 6 inches per mile. The consequence of that is this, that at low water, at all times, there will be from 10 to 13 feet of water in the sewer, which will be constantly lying at the bottom of the sewer twelve miles up. (Hear, hear.) That is the proposition.

Mr. Leslie: Repeat that, Mr. Carpmael.

Mr. Carpmael: Their proposition is this:—Their invert is to be 28 feet on one side, and 29½ feet on the other side, below Trinity high-water mark. The effect of that is—and by their own documents and their own sections they show it—that the low-water mark is 10 to 13 feet above the invert at all times. (Hear, hear.) That is the state of things. Consequently, as Alderman Humphrey asked the engineer to-day, the sewer can never empty itself. They then say they propose, at high tide, to take water into their outfall channels, in order to supply that which the sewerage will not supply them with—namely, a filling of these outfall channels; because they say that, if they have not a full channel, the sewerage will not run at 1·7 miles per hour on an average; therefore, they must keep the channel full in dry weather by putting in five-sixths of water to one-sixth of sewerage. That is their proposition. They propose to take in water—into what? into reservoirs; and then from the reservoirs into the channels. But they are silent as to the depth of the reservoirs. Our engineer at once detected the great fallacy upon which they had founded their scheme—that it rested mainly in what was the size and what was the depth of the reservoirs. You will scon see what effect the reservoirs have upon the scheme. I have told you that the top of their outfall channel is on a level with Trinity high-water mark on one side, and 6 inches above it on the other. Now, spring tides at Woolwich are coincident with Trinity high-water mark. It is quite clear, therefore, they can never take in water higher than Trinity high-water mark—that is, spring tides. The neap tides are 5 feet lower than Trinity high-water mark. Any water, then, taken in for the outfall sewers must be, in neap tides, 5 feet on one side of the Thames, and 5 feet 6 inches on the other side of the Thames, lower than the level of their outfall sewers. That would reduce their outfall sewers 11 feet, in place of 16 feet deep, which they say must always be full. I say this is the greatest fallacy ever propounded in engineering, to fancy they can get an altitude at Woolwich, a constant higher head of water than they have in the river, from which they are to derive it. It is quite clear that, if they can have an altitude affording a height of head at Woolwich above the height that the water ever rises to, they could always drive out every particle of sewerage in their outfall channels. But as they are dependant upon the Thames to get that altitude, they can only get it as the Thames brings it to them, and that will not bring them a constant head under any circumstances whatever. Supposing the reservoirs were deep enough to keep up an altitude of head water at spring tides, and supposing they have no gates at the outfalls, it is clear the tide will rise into the outfall sewer to the same height that it does in the Thames; therefore, there is a common state of things in the two—in the outfall sewers and in the Thames. At spring tides the water will flow up the channels to Woolwich to Trinity high-water mark; so it will in the Thames. By some strange reasoning they have got into their minds that, because there is a difference of four feet at Sea Reach at the time it is high water at Woolwich, they have got that head in their favour. So has the Thames got that in its favour—they are both alike. The tide will flow just as freely in the Thames as in the outfall channels; if left to go down together, they will go down together, and will keep a constant state of similarity to the end of the chapter. I cannot expect you as members of this board to take from me these discrepancies, or whatever other name you like to call them, against professional brethren of mine; you cannot take these from me as the right state of things. I cannot ask you, therefore, to come to a resolution that this scheme is based on a fallacy. I can only ask you to call in further professional aid to investigate that scheme, and report whether the engineers who have propounded it are right, or whether that which I am telling you is the correct version of the story. That is the reason why I ask you to vote with me for the course I have suggested. Further than that, I ask it for another reason. Although the referee engineers had before them a number of eminent men examined upon a variety of subjects, yet they never asked one of those witnesses a question upon their own scheme. It never comes out from end to end of the evidence that they took. They took evidence upon everything else, but they did not submit their own child to be dressed and looked at by any of the professional men that they had before them. Therefore, I think I am right in saying, it is but fair that this board should not be carried away by eminence of names, but should submit the plan of these gentlemen to the inspection and the report of men of equal eminence, who will advise us,—and through us the First Commissioner of Works,—and bring about, I have no doubt, a thorough understanding. I may say a great deal more upon the proposed fallacious action of this scheme, but I defy any gentleman present to show me how they can get water in at the spring tides and at neap tides, so as to serve, during the remaining time between high tide and high tide, as a superior head to drive out all before it into the river, where the water is supposed to be somehow or other at a lower height. And this brings me to the reason why we ought also to send our own reports to the same engineers. Our own plans have been recommended to us by our engineer, for whose skill and judgment I entertain the very highest respect. The more I have laboured to investigate the plans of others, the more satisfied am I that he has more practical knowledge, both in detail and in principle, in regard to this particular question than any other man now living. (Hear, hear.) I say it with confidence I was a stranger to him when I entered this board. I investigated his plans in the same rigid way that I would investigate any other plans laid before me. I have no purpose to serve; I only seek to have the very best plan that can be devised for carrying out the work submitted to us. And I must say this, if, upon investigation, there can be found any propositions in the Government engineers' report which can be of advantage in the carrying out of our own scheme, I, for one, would with the greatest pleasure, advocate the change. Above all, if we can get that which they promise to be able to get us, a larger area, dealt with by gravitation only, I should be too delighted to accept such a discovery as a means of improving our plan. But, after the investigation I have been able to give the proposal, I can assure you that the thing is impracticable. Gentlemen, I told you just now that our report has come back to us with greater honours upon it, after having been submitted to a most fiery ordeal, than any plan of the kind I have ever heard of in the course of my professional experience. I was delighted when I heard that the referee engineers had sent copies of our plan to all the district engineers, in order to get a report from them as to the sufficiency of the plan for the requirements of their respective districts. Now, every local engineer is supposed to know, and, so far as my experience and information go, does know most thoroughly, the requirements of his own locality. Forty gentlemen of talent and standing have had our plans before them. What scheme, I ask, was ever propounded, to cost, as this does, £2,800,000, and pervade the whole of the metropolis—already having a network of sewers so intricate that it is the greatest difficulty for parties, even in their own localities, to know and understand them—what plan, I say, was ever propounded that could be hoped to meet the general approbation, or the moderately general aprobation, of forty gentlemen to whom it was referred? In the letter sent by direction of the referee engineers, the question is asked: "I am further directed to inquire, for the information of the referees, whether the plan proposed by the Metropolitan Board of Works, as described in Mr. Bazalgette's report, will, in your opinion, be sufficient for ——— district, and whether there will be any sewer in your district at so low a level as not to be susceptible of sufficient drainage by the proposed works?" Now, was there ever a fiery ordeal to submit a large plan to more intense than this? (Hear, hear.) I unhesitatingly say, that I never heard of one, nor do I believe there ever was one heard of. Forty gentlemen have this plan sent to them. Do they object, or any one of them, to the broad principles? Not one in the forty. Do any of them disagree with the main section of the scheme? Yes, one; and that one is the engineer of Lambeth. He has accepted the honourable member for Lambeth's scheme, propounded at this board at an early period of your sittings. He is the only gentleman who ventures to disagree with any portion of the plan. There are seven other engineers out of the forty who have not answered the question one way or the other. There are six others who, not objecting to any one portion, suggest certain detailed variations, not important, apparently, but offering conveniences for the districts to which they belong. But the other 26 accept your plan, and tell you that it is amply and properly sufficient to carry out the great works required. Well, I say, have not your plans come back with a degree of credit and a degree of stability with which no plan of any former engineer had been honoured? I submit that a plan with so much credit upon it ought not to be rejected by the board because another plan had been recommended to their consideration. You ought to support your engineer if, upon investigation, you find that he is correct in the views he has taken. Can I say more in praise of the works of our engineer than that they are approved by such a mass of engineering talent, possessing such accurate technical and local knowledge as these gentlemen do? I submit that, really and truly, the only proper course for you to take is this, to have further professional skill called in. If that professional skill should turn out to differ from your engineer, give the weight to it that is due; but if, on the other hand, the gentlemen whom you may appoint tell you all that I have told you to-day, then I say it will be the duty of this board to go up to Sir Benjamin Hall, and say, "These are the plans that we adhere to," or, "These are the plans, subject to these variations, that we have determined upon, and now we must leave it in your hands to determine whether you will support your referee engineers, or whether you will support us in carrying out the works which we propose." I now beg to move, "That the reports of this board, submitted to the Commissioners of Her Majesty's Works and Public Buildings, also the report of Messrs. Galton, Simpson, and Blackwell, be referred to two eminent engineers and the engineer of this board, to report thereon at their early convenience."

Major Lyon would be glad to second the motion in its present form, but he wished it to be understood that he did not consider himself bound to vote for the two names submitted by Mr. Carpmael. He did not say that he should vote for them or against them—that would be a matter for after consideration. He seconded the proposition, because it was precisely similar to the one he made himself in February, 1856. He regretted that his proposal was not carried at the time, for, in addition to the loss of time which had ensued, the board had deprived themselves of the advantage of going with their plan to the Chief Commissioner, with all the weight which it would have derived from having been endorsed by competent professional men. They could not be surprised at the course which Sir B. Hall had taken. Not being an engineer himself, and having a plan before him drawn out by one engineer only, neither Parliament nor the country would have been satisfied if he had accepted it without some additional advice. He had taken that advice, and they could hardly expect him to be satisfied with the plan, when the three gentlemen to whom he had referred it found fault with it. Under these circumstances, he thought the step proposed by Mr. Carpmael the best that could be adopted, notwithstanding the loss of time which it would entail. They had a very important work in hand—a work which was to last for hundreds of years—and it was, therefore, better to sacrifice six or twelve months rather than do that hastily which ought to be well done.

Mr. Wright thought it would be convenient for the board that he should lay before it, at as early a stage as possible, a counter-proposition to the one under consideration. He was sure no member of the board could do otherwise than admire the manner in which Mr. Carpmael had laid the subject before them, displaying not only an enormous amount of industry in the investigation of this scheme, but bringing to bear an amount of professional experience and knowledge seldom heard in that room. He was prepared to go with that gentleman to a very great extent in much that he had stated, but, at the same time, he must say he thought it would have been better to have heard these explanations from their own engineer. It

occurred to him that, upon matters involving professional opinion, it was desirable that they should take the opinion of the official engineer of the board, because, if one individual member gave his professional opinion, it was likely to come into collision with the professional opinion of some other member. Therefore, he would not follow Mr. Carpmael into a minute examination of the scheme, but would endeavour to base his observations upon the answers which their own engineer had given to the questions put to him. That gentleman was responsible as to whether he was right or wrong. Now, let them take a business view of the question. As a board, they had a certain duty to perform—subject, however, to the acquiescence of another board. Let him ask what they would do in a private capacity under these circumstances? If they had a matter in dispute with another individual, their first endeavour would be to find out how far they were apart, and then to find out how far, by conciliation, they could come together. Well, let them see how far the First Commissioner and the board were apart upon the present question. Let them give Sir B. Hall every credit for having done his duty; it was no part of their duty to take the mote out of his eye, while they kept the beam in their own. If they would examine the two schemes, they would find that they differed in very few particulars in which engineers could help them. In the first place, then, let them ascertain how far they differed upon points which were not engineering points. The most important difference arose as to the point to which the sewerage should be carried down the river. The board were required to take it to a point which, if they had money enough from a particular quarter, they had all along admitted they were willing to do; and Sir B. Hall had said that he thought the board ought to be assisted. This was not a question to be referred to two eminent engineers. If they were asked how much they thought Government should pay and how much the board should pay, they would turn round and say, it was no part of an engineer's duty to settle such a question. Very well—they got rid of that portion of the subject. What was the next part of it? The referee engineers recommended the drainage of a larger area than the metropolitan boundary. That was not within the powers of their Act of Parliament, and they could not, therefore, entertain such a proposition. It was true they could go to Parliament for powers to extend over a larger area; but the public would look with very great suspicion and jealousy upon any such step being taken by the board. That cut away another branch of the subject. What was there left? Only three points. The first was the proposal to carry the drainage across from the Middlesex side to the Surrey side of the water. He did not value that point much, though he might state that his own private opinion was in favour of such a mode of drainage. It might be a fairly-contested point between engineers whether it was advisable to carry the constantly-increasing drainage of the western part of London, by means of tunnels, through the very heart of the city instead of through a wide and open plain. Many engineers might take his view of the question, but, for the present, he was content to say that London could be drained in either way. Another point of difference was the increased area of the sewers. Part of this increased area was to provide for an increased rainfall, and part was due to the increased area drained. The increased area drained carried them back to the monetary and legal questions. The question of increased rainfall was not an engineering question. The engineer of the board, in providing to carry off storm waters, proposed to leave out twenty days in the year. The Government engineers proposed, by enlarging the area of the sewers, to leave out only ten days. It was, then, a question of cost between the two schemes, and not one to be referred to an engineer. There was one other point upon which they differed. The Government engineers, in order to save pumping into a high level, had drawn one of their sewers at a considerably lower level, thereby causing a sluggish stream in the channel from the point where the board proposed to discharge, at Erith, down to the outfall at Sea Reach. That was an engineering question, but it was deprived of its engineering difficulty by the fact of their proposing two large open channels down which the sewerage was to be twelve hours in passing. Let any honourable member tell him if they wanted an engineer to decide whether they should have an open or a closed sewer. Just conceive a stream winding like a stinking, slimy serpent from Woolwich to Sea Reach, carrying disease and pestilence along with it, and then say whether they would prefer that to a covered sewer. This was a point which, as business men, they could settle for themselves without the intervention of engineers. Instead of referring the plan to engineers, which was in itself an antagonistic measure, it would be better to go to Sir B. Hall—who had not rejected their plan—and state the grounds upon which they stood, and he guaranteed that within two months they would be able to come to an amicable and satisfactory arrangement. Was it wise in the board to stand upon points of dignity? If they were belted knights instead of a board of works they could not show more dignity than they had done. He called upon them as business men to deal with the question. With their permission, he would now develop the course which they ought to pursue. He thought the board should agree, in the first place, to a resolution indicating the opinions they entertained with reference to the report and plan of the Government engineers, and that they should afterwards appoint a committee with instructions to amplify the resolution into the form of a manifesto, preparatory to an interview with the First Commissioner. He would suggest that another resolution should be passed, condemnatory of the proposal of an open sewer, leaving the other points of engineering to be a matter of conference with Sir B. Hall. He would say one word more in favour of this course. The board owed a duty to the public. At the present moment every district board was actively at work putting down fresh drainage every day, and sending fresh soil into the river. The tidal wave of the Thames was not larger, but the tidal wave of the sewerage was becoming larger and larger every day. Every day that they allowed this great matter to lie in abeyance, there was no doubt that susceptibility to certain kinds of disease would be increased. The cholera was in Sweden and Denmark, and we did not know the day nor the hour when it might cross over to England again. Now, it was the opinion of those who attended to sanitary matters, that there was nothing so likely to engender diseases of that character as the miasma arising from sewerage matter surging up and down the river Thames, particularly at this season of the year, when the atmosphere was peculiarly charged with moisture. Every hour was of importance, and he therefore hoped, considering the urgency of the case, that the board would put aside a little dignity, and take steps to bring about a speedy settlement of the question. Mr. Wright then moved the following resolution, as an amendment upon the motion of Mr. Carpmael:—"That this board regrets that the First Commissioner of Her Majesty's Works has rejected the plan B* without communicating to the board the reason for its rejection. That this board, with the assistance of its engineer, has carefully considered the scheme proposed by the referees appointed by the First Commissioner, so far as the materials furnished have enabled them; and that, while entertaining great respect for the eminent engineers consulted by the First Commissioner, it has arrived at the conclusion that the scheme proposed by them cannot be adopted by the board. That this board, while it regrets the further delay in carrying out the great sanitary work of the main drainage, is gratified to find, by the report of the referees, that they have adopted the principles of the plan of this board as a basis for their scheme, notwithstanding the latitude of investigation given to them in their instructions by the First Commissioner, and that the differences upon this important question are now reduced to a few tangible points, viz.:—Recommendations which this board has no power to carry into effect. Recommendations of works the expense of which it has been admitted by the First Commissioner that the board cannot with justice be called upon to defray out of the metropolitan rates.—Differences of an engineering and sanitary character upon the following points:—Open sewers, with diminished falls; the western sewerage carried on the Surrey side; a large increase in the dimensions of sewers to provide mainly for an increased area and rainfall."

Mr. TURNER seconded the amendment, as possessing an advantage over the course proposed by Mr. Carpmael. He would briefly go over the different paragraphs of the amendment, and state the grounds why he hoped the board would assent to it. The first paragraph expressed regret that the First Commissioner had rejected plan B* without stating the reasons for so doing. He thought this a perfectly fair remark on the part of the board, and one to which nobody could take exception. (Hear.) The next paragraph was to the effect that the board had considered the plan suggested by the referees, "so far as the materials furnished have enabled them" to do so, and had come to the conclusion that it could not be adopted. Though the materials furnished had not enabled them to go through the plan in its full integrity, yet he thought there was quite enough shown to justify the board in rejecting it. The proposal to have open sewers was utterly condemnatory of the scheme. (Hear, hear.) As had been said by Mr. Wright, it would be a nuisance worse than any that at present existed. Upon the showing of the referees themselves, their plan was either objectionable or unnecessary. It was objectionable if the sewerage could not be mixed with such a quantity of river-water as to destroy the noxious effluvia; and, if it could be mixed with such a quantity, it must be self-evident that there could be no objection to carrying it into the Thames. The Government proposed to mix the sewerage with six times its own bulk of the water, alleging that that would render it perfectly harmless. If that were so, why not turn it into the river at once, where it would be mixed with 700 times its own bulk of water? If harmless in the ditch, *à fortiori* it would be harmless in the river. He thought this patent objection to the scheme quite enough to induce the board to come to the conclusion that the plan was one they could not adopt. What the mover of the amendment proposed to do was, to state in a few words what the differences were between the board and the referees, to tell the First Commissioner that they considered these to be matters of discussion, and to propose a conference with him, with the view to an amicable arrangement. These points of difference were none of them serious. He would make an observation upon one or two of them. For the purpose of carrying off the storm waters, except on ten days in the year, the referees proposed to increase the capacity of the sewers, but the board had not been told what that increase would be. He had carefully examined their report, and he found that the discharging power of the sewers was just three times the discharging power of the sewers recommended by Mr. Bazalgette. He was not prepared to say what the expense of trebling the capacity of the sewers would be; but, assuming that it would be double Mr. Bazalgette's estimate, the ratepayers would have an expenditure of £2,000,000 additional thrown upon them, merely for the trifling advantage of preventing the overflow of storm waters into the Thames ten or twelve days in the year over the plan proposed by the board. And it was not an unmixed advantage, because, in order to obtain it, they would be obliged to have sewers so broad, that when there was no rain and no water flowing through, the velocity would be greatly impeded, and the sewers would be liable to foul.

The SECRETARY read the original resolution and the amendment, and the chairman was about to put them to the vote, when—

Mr. Deputy HARRISON said, there were a number of gentlemen who wished to say a few words before the division was taken. He should not allow the matter to go to a division without giving his opinion as to the course the board should take. He would say a few words upon the amendment first. It declared that the board, with the assistance of their engineer, had examined the plan, and had come to the conclusion that they could not adopt it. Allow him to ask, what sort of examination had the board had, even with the assistance of their engineer? One honourable gentleman had asked a question, and had received an answer. Another honourable gentleman had asked another question, and that had been answered. What was the answer of the engineer when asked whether he had examined the plan of the referee engineers? His answer was this: that he had not been able to do so, because he had not the information before him to enable him to come to any conclusion upon the subject. The amendment went on to say, the board had examined the plan, with the assistance of their engineer, and after that examination had condemned it. Why, that was not the state of facts. Let him read the words so that there should be no mistake. The first question put to the engineer was this: "Have you examined this plan?" This was his reply:—"My answer is, yes; I have, so far as they admit of examination. But while the report contains a vast mass of information upon other points, it contains very little with respect to the plan suggested by the Government engineers." Mark that—the plan of the Government engineers! It contained so little that the engineer of the board had not been able to examine it. He went on to say—"There are no plans or sections of any of the works required within the metropolis; these the engineers say they had not time to prepare: or, in other words, they have still to be designed. The only information given are two small sections of the outfall sewers from the metropolitan boundary to Sea Reach. There are no cross-sections of any of the sewers; no information as to the size, level, or mode of filling the reservoirs with tidal water, and supplying the sewerege canal therefrom." That was the answer of their engineer: that he was incapable te report upon the plan because he had not the information requisite to enable him to do so. He believed this to be the real state of the question at the present moment. It was the want of knowledge on these points which prevented their engineer reporting to them, and it was the want of this knowledge on their part which ought to deter the board from saying they had examined, and therefore condemned, the plan. (Hear, hear.) The honourable gentleman opposite (Mr. Carpmael) gave the strongest opinion as to the impossibility of working the cleansing part of the Government scheme. His friend near him seemed to say that he differed from him on that point. Here were two gentlemen, equally qualified to form an opinion, at issue upon one of the most important questions involved in the recommendation of the Government engineers, and yet the board was asked to condemn their plan, and to reject a course by which they would be enabled to obtain the requisite information as

to the details. But Mr. Wright went further than this. He urged the board not to take the engineering dictum of an individual upon any engineering point, but to procure the opinions of engineers. That was the very course suggested by Mr. Carpmael. He himself took the same view, and it was in the full conviction that it was the duty of the board to examine these plans with the greatest possible care and attention that he most readily supported the original resolution. He, for one, was not capable of examining a question of deep engineering difficulty. He wanted to be advised upon the subject, and he knew if they referred the plan to two engineers, associated with their own, that a report would be prepared which would enable even an unprofessional man to come to a right conclusion. He would now look for a moment at the exact position of the affair with reference to Sir B. Hall. For the third time the First Commissioner had found it necessary to reject the plan submitted by the board; and, in his last communication, he begged of them to examine the plans that have been prepared under his direction by Messrs. Galton, Simpson, and Blackwell. Upon what principle could the board go to Sir B. Hall if they neglected to examine in detail the whole of that plan? Would not Sir B. Hall say—"Well, gentlemen, have you caused any inquiry to be made? You raise a great many objections to this plan of three of the most eminent engineers I know; what *data* have you got? what opinions have you got?" (Hear, hear.) It was natural that Sir B. Hall should ask the board to examine the plan. He did not endorse it with his own approval, but he asked them to examine it. His object was the same as their own:—viz., to have the best plan that could be prepared. Would it satisfy the public—would it satisfy anybody—that the plan of three eminent gentlemen, acting upon instructions from a Government department, should be merely examined by their own officer, however talented the gentleman might be? He agreed with Mr. Carpmael that there was no man in this country who knew so much about sewerage as Mr. Bazalgette did; but, with all that knowledge, could his judgment stand against the declared opinion of three such eminent men as had been called in? Everybody knew that it was no use pitting one man against three. He must admit, however, that notwithstanding the eminence of these three gentlemen, there were points in their scheme so absurd that they could not be agreed to for a moment; and there might be other points equally impracticable, which an examination by other professional men would be able to discover. For these reasons, and out of respect to the department over which Sir B. Hall presided, the board ought, as they had been asked to do, institute a scrupulous examination into this plan. With respect to the terms of the amendment, that they should seek a conference with Sir B. Hall upon points in dispute between the two schemes, was there ever such a proposition, he would ask, made to the head of a Government department? He had a plan prepared by three of his appointed officers, and the board had a plan prepared by their one appointed officer, yet he was to be asked to throw over his plan and accept theirs! Was it not foolish to expect such a thing? What would Sir B. Hall say?—"Really, gentlemen, I am no engineer; I cannot go into the plan. I have appointed three men at the public expense. You must show me some reasons why I should not rely upon their judgment." It was to meet this probable state of things that he advocated the course proposed by Mr. Carpmael. That was the only course for them to adopt, they might depend upon it. The Act of Parliament distinctly said that the board must initiate a plan for the approval of the First Commissioner. The position they were now in was this, that they had no plan to submit. The sooner, then, they set about preparing a plan founded upon the information they had obtained, the better. If they went to the First Commissioner in the manner proposed by the amendment, he was afraid it would appear that they had not ability to prepare a plan at all. ("Hear, hear," and laughter.) If they allowed much further delay, the time for them to act would soon be passed. Their last plan having been rejected, it was their duty to send up another with every imperfection removed, and to send it up as early as possible, that it might meet the approval of Government and satisfy the public.

Mr. Howes did not at all apprehend that Sir B. Hall would think the board had not the capacity to grapple with this great question. He thought the way in which Mr. Carpmael, Mr. Wright, and Mr. Deputy Harrison had dealt with it, would satisfy any body upon that point. The board had before them two courses indicated, and it was for them to decide which they would adopt. He did not mean to say that at some time or other a reference might not be required, but this was not the time for a step of that kind. There were many points which could be cleared up without reference to an engineer at all. Mr. Carpmael laid great stress upon the request of Sir B. Hall that the board should well consider the plan sent down. How were they to consider it? ("Hear, hear," from Mr. Carpmael.) Had Sir B. Hall possessed the advantage which this board possessed of having a legally-appointed engineer at his elbow, he ventured to say, there would have been no reference to these three gentlemen. They had that advantage, and through their engineer they at once saw several points in the report sent down that were not tangible at all. Why, all could see at the outset, professional and non-professional men, that the scheme of two open sewers was a fatal objection. This and other points of difference had been so well explained by Mr. Wright as to have convinced him of the propriety of the step suggested by that gentleman, and see whether, by a conference with Sir B. Hall, the matter could not be satisfactorily settled without further reference to engineers.

Mr. Crellin agreed neither with the resolution nor with the amendment. As remarked by Mr. Deputy Harrison, it was the duty of the board to initiate a plan, but he did not see how this object would be accomplished by following either of the courses suggested. Instead of referring again to other engineers, who might themselves commit an error, why not take their stand upon the opinion of their own officer, who, they were all willing to admit, was eminently qualified to give advice? He thought it best under the circumstances for the board, without seeking further assistance, to take the whole subject again into consideration, especially with reference to the utilization of the sewerage. (A laugh.) The deposit on the banks of the river was productive of a noxious miasma, and it was idle to suppose that, by discharging the sewerage at a point lower down, the mischief would be averted, while, at the same time, they would be doing wrong to the ratepayers if they did not endeavour to convert the sewerage into a source of profit. As to going to Sir B. Hall, he did not wish to stand punctiliously on dignity, but he did hope the board would not condescend to such a loss of dignity as that. (A laugh.)

Mr. Dennis opposed the amendment, and examined its paragraphs *seriatim*. The first paragraph spoke of the rejection of their plan without reasons being assigned. Now, the reason why Sir B. Hall rejected it was because, according to the opinion of three eminent men, it would shoal up the river at the point of discharge. The second paragraph stated that they had "carefully considered" the scheme of the referees. That was not true. He had looked through the plan in vain, and did not understand it; nor did he believe that Mr. Carpmael, with all his ingenuity, thoroughly understood it. Why, then, should they go up and make a statement that was untrue? If they wanted to put themselves in a ridiculous position, that would be the way to do it. The plan, for aught they knew, when examined by other engineers, might be reported to be an excellent one. Yet he, for one, though he felt disposed to see the increased area proposed to be drained brought into the system, must say that the plan of two open ditches could not be tolerated for a moment. Neither did the engineers themselves believe that it would be tolerated. They thought, as a matter of course, the sewers would be arched over, but the expense would be so great that they dare not name it. He had, on a previous occasion, stated his belief that the main drainage of the metropolis when carried out would, in round numbers, cost £10,000,000. Taking the sum which the referee engineers said it would cost with open ditches, and add to that the cost of covering those ditches, and there was the £10,000,000 accounted for at once. The amendment appeared to him entirely out of place. If Mr. Carpmael's motion were carried first, and acted upon, then would be the time for a deputation to wait upon Sir B. Hall with the plan finally agreed upon. But they had no plan now, and were they to go to the First Commissioner, they would be like a number of wooden men—(laughter)—having nothing to say, but throwing themselves upon him for advice. If they had the capacity to deal with this question, which he began to doubt, it was time for them to do something; and the first thing to do was to get further information, and see whether the Government plan could be carried out or not.

Mr. H. L. Taylor could not help thinking that Mr. Dennis was right in the course he advocated, viz., to send this plan to two or three engineers. If they were to take the course pointed out by Mr. Wright, they would be adopting a course which did not become the board. They had been humiliated enough by the honourable baronet at the head of the Board of Works. When they remembered the position in which they had been placed on similar occasions, they must know full well that they would only be putting their heads into a hornet's nest by going into the rooms of Sir B. Hall. At present the honourable baronet was on the horns of a dilemma, and he wished to keep him there, because he had been the grand instrument to defer the main drainage of London to an indefinite period. There could be no doubt that the board had been constituted through the instrumentality of that honourable gentleman for the purpose of carrying out the main drainage; but the course that he had pursued, which they were now considering, was virtually to take it out of their hands. It was a course not authorized by Parliament, not justified by public principle, of which the honourable baronet had too little—(Order, order)—not justified by a right and just discrimination, but by an overbearing rule and overbearing conduct which every right-minded man must condemn. He was a second Nena Sahib. (Laughter and "order.") It was almost difficult to know how a public board should deal with the question, especially in the manner propounded by Mr. Wright. There was no doubt that to adopt his amendment would be to play into the hands of Sir B. Hall. There was nothing in the world would please him better, now that he was on the horns of this dilemma, than to bring them at his feet, by their soliciting a conference. He agreed with many of the views contained in the amendment; but this was not the time to put them forward. The best course to pursue was to retrace their steps, and endeavour to do their duty in that which Parliament had enjoined upon them, and which no other body had the privilege to do, viz., to initiate a plan. They were now without a plan. They had had something sent to them, not certified, not endorsed by the minister who had sent it, but sent for the purpose of gathering their opinions upon it, so that he might by-and-bye make his course just as it suited his purpose. He had a perfect right, and would not have been doing his duty, if he had not caused the plan B* to be thoroughly sifted; but he did more than that, and it was here that the honourable baronet had committed himself—he had travelled beyond the record of the Act of Parliament. After having stated that he would not interfere with this board in the discharge of their duty, he, in his next letter to them, stated that he had given instructions for the question of the drainage to be referred to three gentlemen whom he would appoint. He had done so, and the result was before them. The question, then, was, would they come to a resolution on the plan before them, or would they call in the assistance of those upon whose opinion and judgment they might rely? That was the question. He was not confining himself to two engineers; he would rather take three, associated with their own. They ought most assuredly to send all the plans to these gentlemen to report upon them. He should vote in favour of the original motion.

Mr. Wilkinson confessed, after the consideration he had been able to give to the question, that he had come to the conclusion to support the amendment. He should not follow the last speaker in the remarks he had made upon the First Commissioner, who had simply done his duty, and they had no reason to complain of uncourteous treatment at his hands. Leaving that, they had to consider how they could bring to a successful and speedy issue this great question of the drainage. He considered the speech of Mr. Carpmael a complete justification of the statement in the amendment, that they had examined the plan of the referee engineers, and a complete answer to Deputy Harrison's objection on that head. If the differences consisted of engineering points, the course proposed by Mr. Carpmael would be the proper one; but he thought those who had listened to Mr. Wright's speech must feel convinced that these were not points upon which they required the assistance of engineers at all. Their own common sense would enable them to decide for themselves; and if there were any engineering questions of detail, surely half an hour's conference between the engineer of the board and the three gentlemen named by the Government would enable them to arrive at a satisfactory conclusion. He still inclined to the opinion that the sewerage ought to be deodorized; but after the full investigation which had been given, he would not hamper the board with that question now. On the whole, he thought the course pointed out by Mr. Wright the proper one, and he conceived that no sufficient cause had been shown for the motion of Mr. Carpmael.

Mr. Doulton had listened to Mr. Carpmael with the attention which he deserved, and which the importance of the subject demanded, but he had certainly failed to discover anything to justify him in assenting to the course he had asked the board to adopt. If it was his object to widen the breach between the board and the First Commissioner, to postpone to an indefinite period the settlement of this question, and to bring about a dissolution of the board, then one could understand why such a proposition should be made. The Government referees took just nine months to get out their voluminous report, and it was not unreasonable to suppose that these other referees proposed by Mr. Carpmael would take the same time in preparing their report. Where would the board be then? Parliament would be sitting, and the session would be drawing to a close. Did any one imagine, if nine months hence the board should be in the same position with reference to this question that they were now in, that Parliament would separate without separating them? If they passed half the time allotted to

them for carrying out this great work in doing nothing, Parliament would be justified in taking the work out of their hands, and placing it in the hands of those competent to carry it out. But, supposing they adopted the course proposed by Mr. Carpmael, the report of the engineers would be either in favour of the referees' plan, with certain modifications; or in favour of the board's plan, with certain modifications; or, what was still more probable, in favour of a plan of their own. Suppose they adopt the referees' plan, would a single member of the board be more inclined to carry it out then than now? Suppose they were to recommend the plan prepared by the board, would Sir Benjamin Hall be more inclined to adopt it than now? Or suppose, as was most probable, they should recommend a plan of their own, would not that make confusion worse confounded? Further, to understand the full force of his objection, look at the men to whom it was proposed to refer this question. Mr. Bidder was a partner of Mr. Stephenson, who was committed over head to the plan of Mr. Bazalgette; and, with respect to Mr. Hawksley, Mr. Bazalgette had again and again acknowledged that he had derived much valuable information from Mr. Hawksley—that the formula he had adopted for his calculations were Mr. Hawksley's; he thought they would be farther off a settlement than ever, and that the differences which existed between them and the Chief Commissioner would be considerably widened. This was a time when they should not stand out on small points of difference, but see whether they could not unitedly accomplish what all other bodies had failed to do. He accepted the amendment, because he saw in it the first step towards bringing about that which they ought never to have got out of—accord with Sir B. Hall—and because, if they adopted the original motion, it would postpone the settlement of the question for an indefinite period. But the principle why he supported the amendment was, because it would place them in a more satisfactory position with Sir B. Hall.

Colonel KENNEDY supported the amendment, because he believed they had received from their engineer all the advice that could be obtained upon the subject. Professional opinion was essentially critical; if, therefore, they were to consult three other professional gentlemen, it would only be adding to their present difficulties. Besides, if they called in the assistance of other gentlemen, Mr. Bazalgette would have to instruct them upon the subject, for they knew nothing about it. From much experience in matters of this kind, he was of opinion that, if any number of persons were made referees, the instructions to them should be to examine the subject together, but each to make a separate report. He never knew a collective report which contained the entire opinions of any one of the parties making it; there were givings and takings, by which the whole efficacy of individual opinions was destroyed. The board had the ablest man to assist them, and they did not require any other assistance. With respect to the plan sent down by the Government referees, there was never a greater absurdity than the scheme proposed by them. They must have forgotten that there is an enormous difference between the levels of spring tides and neap tides. They had forgotten that that difference amounts to about 8 feet, and that this difference must reduce the level in the reservoir to 7 feet. Now, with a depth of 7 feet extending over 20 miles, how can they fulfil the conditions they propose? It was absolutely impossible. He gave Sir B. Hall great credit for the course he had taken. If he had meant absolutely to refuse their project, why should he have referred it to three engineers? He did quite right in taking this step; it was a project of enormous magnitude, and required to be scrutinized. It had been scrutinized; and, if Mr. Bazalgette had reason to be proud of anything in his life, it was of the manner in which his scheme had passed through this scrutiny. In works of this kind, engineers ought to work in conformity with the laws of Nature. He traced those principles in Mr. Bazalgette's plan; he traced in the project sent back by the Government referees hostility to those laws. They had, however, given some most valuable assistance, which he hoped the board would profit by. The gallant colonel concluded by reading extracts from the evidence of Dr. Hoffman and Mr. Witt with reference to the deposit of sewerage in the bed of the river, and the mischievous consequences resulting therefrom.

Mr. WARE said he came to the meeting with a strong inclination to follow the course proposed in the original motion. But the discussion which had ensued had materially altered his views. Perhaps, eventually, reference might be advisable, but to refer the matter in its present shape would be to refer questions which their Act of Parliament did not permit them to deal with. He alluded especially to an increased area of drainage, extending beyond the boundaries of the metropolitan area, and to the open sewers, with respect to which the Act declared that they must be covered. If they could narrow the question, independently of these points, then he thought they might by a conference be able to settle the matter without a reference. He was sorry it had been thought necessary to bring up the name of Sir B. Hall at all. He did not think they could attribute to Sir B. Hall anything with which they could find fault relative to this question. Feeling convinced that Sir B. Hall was as truly and honourably desirous to bring the matter to a satisfactory issue as they could be, he believed, if the board went to him with the views they might have fairly formed, that they would be met in a corresponding spirit, and that all differences between them would be settled.

Mr. D'IFFANGER, jun., who was met with cries of "Question," said he was sure he had been very patient to-day, and after all that had been said, he should not detain them long. He rose to correct an error. It had been said that they had no scheme before them. He could not understand how any gentleman could say that, when the plan which had been sent to the board by Sir B. Hall was the very plan, with certain modifications, which had been prepared by their own engineer. He thought it would be their duty to go to Sir B. Hall, and ask him what modification he would be willing to agree to in that plan, and to consult with him as to the best means of carrying out this great work. There would be no act of humility in this, while, at the same time, they would be consulting the best interests of the public. He was satisfied, from the experience he had of him, that Sir Benjamin Hall would treat any deputation of that board with respect and courtesy.

Mr. CARPMAEL made a brief reply, after which the question was put.

For the amendment	20
Against it	8
Majority	—12

The amendment was then put as an original motion, when there appeared—

For the amendment	18
Against it	9
Majority	—9

The amendment was thereupon declared carried.

Alderman CUBITT said the idea of open sewers was one that never could be tolerated. Public feeling would revolt against it, and public opinion would be emphatically pronounced against it; and he was satisfied that Parliament would never permit such a thing. He therefore begged to move, "That this board considers that the open sewers proposed by the plan of the referees of the First Commissioner are altogether inadmissible, and is of opinion that it would not be justified in carrying out any scheme of which such open sewers formed a part, but that the other points of differences appear to be fair subjects for discussion and arrangement."

Mr. BRISTOW seconded the motion, which was agreed to unanimously.

Mr. BRISTOW then moved, "The appointment of a committee for the purpose of drawing up a written communication to be made to the First Commissioner, based upon the preceding resolutions, preparatory to a conference with him on the subject."

The motion having been seconded, was strongly opposed by Mr. Hawkes, Mr. Leslie, and Mr. H. L. Taylor; but, on the question being put, the motion was carried without a division.

The following gentlemen were named as the committee:—Mr. Bristowe, Mr. Wright, Mr. Alderman Cubitt, Mr. Doulton, Mr. Turner, Mr. Offor, Mr. Dennis, Colonel Kennedy, and Mr. D'Iffanger.

The board, after sitting five hours, adjourned.

LONDON GAS COMPANY.

The Ordinary Half-Yearly Meeting of this Company was held on Wednesday, the 14th inst., at the Freemasons' Tavern, Great Queen Street, Lincoln's Inn Fields—Mr. HAWKINS, Governor, in the chair.

The CHAIRMAN called upon the secretary to read the notice convening the meeting.

Mr. RHODES: Before that is read, I wish to say that there is another meeting called for the same day as this, which was fixed some long time before yours. I applied at your office, and I was told that the time for this meeting was not fixed. I went into the City, and found that the other was fixed. I am sorry to say you clash, being on the same day; but perhaps you could explain that.

The CHAIRMAN: Our ordinary meeting is invariably on the Wednesday before the 15th of October or the 15th of April, at twelve o'clock.

Mr. RHODES: At the last special meeting you held, Mr. Chairman, the shareholders were met at different periods. I was sorry to find that I had not a blue share, so as to be able to come into the room. I applied to know if I could be admitted to sit, and take no part in the business; but I was not allowed to sit in the room. I had to walk the street, and was in Lincoln's Inn Fields from ten o'clock in the morning till the time the meeting began. Now, I went to another meeting where a board was sitting, and they desired me to walk into the room; and I thought that they dealt with me in a kindlier manner than you did.

The CHAIRMAN: I am extremely sorry that we should have been discourteous to you at any time. I am quite sure that a room to sit in you could have had, but none but blue shareholders could be admitted to those meetings. They were very important meetings at the time; they were called under the direction of our counsel, and it was thought expedient that each meeting should be separate. I am quite sure that, as far as the accommodation of a room was concerned, we should always have been glad to give it you.

The SECRETARY then read the notice convening the meeting, and the corporate seal of the company having been affixed to the register of proprietors,

The CHAIRMAN read the following report:—

Your directors submit to you the balance-sheet and half-yearly accounts, showing the result of the manufacture and distribution of the company's gas up to the 30th day of June last. A statement of the profit and loss for the first half year is annexed to this report.

The directors proposed to set aside, out of the profits, £3400 to meet contingencies, after which, as will be seen by the statement of the dividend-fund, a sum of £9337. 11s. 5d. remains applicable for dividend. Of that sum, £4109. 5s. will be appropriated to the dividend upon the first preference shares of 1849, payable on the 15th instant, leaving a balance of £5288. 6s. 5d. to the credit of the dividend-fund, out of which the directors recommend that £1. 10s. per share (being at the rate of 6 per cent. per annum) be paid on and after the 16th instant, by way of dividend, on the preference shares of 1840, commonly known as blue preference shares.

The rapid improvement in the condition of the company, which has formed so remarkable a feature in the accounts of the three last half years, is equally observable in this, notwithstanding the continued and still increasing diminution which has taken place in the prices obtainable for coke and other products resulting from the manufacture of gas. The profits of the half year, after writing off £7730. 7s. 1d. for depreciation, have amounted to £13,361. 13s. 5d., being an increase of £5858. 19s. 5d. upon those of the corresponding previous half year.

In testing the brick tank for the new gasholder at Nine Elms, a part of the puddle was discovered to be defective. Our engineer and consulting engineer report that this defect has now been remedied, and that the company will have the benefit of the gasholder in the coming winter.

At the extraordinary meeting which followed immediately upon our last half-yearly general meeting, resolutions were passed with the object of facilitating the obtaining the decision of the Court of Chancery upon the rights of the holders of the blue and red preference shares, and the ordinary shares respectively, to dividends and arrears of dividends. Both at that meeting, and subsequently by individual shareholders, so strong an opinion was almost unanimously expressed that, previously to seeking a legal decision, no effort should be spared to effect an amicable compromise, that the directors prepared a scheme accordingly. At separate meetings, held on the 15th of May last, of the holders of blue, red, and ordinary shares respectively, resolutions were unanimously passed sanctioning that scheme, and authorizing the directors "to make an immediate application to Parliament for carrying the resolutions into effect, with such variations in the same as Parliament might require." A copy of these resolutions was sent to every individual shareholder not present at the meetings, with a request to signify by letter his or her assent or dissent. Nearly all the numerous shareholders from whom answers were received assented—none dissented.

An Act of Parliament has accordingly been obtained, embodying the scheme sanctioned by the resolutions, but with the following variation, which was insisted upon in the passage of the bill through the House of Lords; namely, instead of placing the stock to be accepted in lieu of their claim to arrears of dividend by the holders of the blue shares, next in order to the blue shares themselves, and in priority to the red shares, that stock is placed immediately after the red shares, but in priority to the stock to be accepted in lieu of their claims to arrears of dividend by the holders of the red shares. Though the directors would have preferred the adoption of the scheme as it originally stood, yet they consider the obtaining the Act, even though with the above modification, a subject of great congratulation to every class of shareholders.

But the directors have yet another matter to communicate of the utmost importance to the well-being of the company, and, equally to the passing of the Act, a subject of congratulation. Arrangements have been made with other companies carrying on their operations north of the river Thames, by which a separate district is assigned to each. The advantages of this arrangement to the company are obvious, and they are scarcely less so to the public. Where the mains of several companies run through the same district, whenever those of any company are repaired, the surrounding soil is disturbed, and in settling loosens the joints of the mains of the other companies, which then require repair; and so the joints in the mains of the first company become loosened in their turn. And that this process of repairing their own and injuring their neighbour's mains is repeated in succession by the several companies, occasioning to each a great expense and loss of gas, and to the public constant stoppage of traffic and injury to the pavement, and still greater evil of having the soil of the streets so saturated with gas as to become extremely offensive, if not injurious to health. All these evils are obviated by assigning to the companies separate districts, and to which the diminished expenses will, in all probability, enable the companies to continue to supply gas without any increase of price, which from the great and increasing falling off in the prices obtainable for coke and other gas products, might otherwise have been unavoidable. But our shareholders should be warned that the advantages of districting to this company are prospective, and that no benefit resulting from it, but rather the contrary, will most probably be apparent, both in the current and following half years.

BALANCE-SHEET, JUNE 30, 1857.

Dr.							*Cr.*						
To 7730 shares			£386,500	0	0		By purchase of estates at Vauxhall and Nine Elms—machinery, building, and expense of Act	£237,748	7	1			
5479 first preference shares			136,975	0	0		Cost of ovens	22,347	2	2			
				£523,475	0	0					£260,095	9	3
Bonds				83,030	0	0	Mains				206,162	1	8
Mortgages				17,000	0	0	Services				32,016	14	8
Temporary loans				13,325	0	0	Meters in use				10,891	5	7
Trade and other debts				27,968	10	9	Office fittings, furniture, &c.				659	16	10
Unpaid dividends			£1,855	19	2							£509,825	8 0
Interest on shares, 1845			2,986	15	2		Goods and products in store					10,201	13 7
				4,842	14	4	Amount to receive on shares					10,657	13 5
Contingent-fund				1,463	4	6	Do. owing for gas				£39,249	15	1
Balance of profits, viz.:—							Do., do., for coke				4,094	2	8
From previous half year			£9,272	4	5		Do., do., for house rents				1,586	9	0
Half year ending June 30, 1857			7,053	2	0		Do., do., for sundries				2,217	13	4
			£16,325	6	5							47,148	0 1
Dividend, first preference shares, March 31, 1857	£4,109	5 0					Cash in hand					5,655	12 6
Dividend on blue shares	2,878	10 0					Balance, December 31, 1856					96,953	13 5
			£6,987	15	0								
				9,337	11	5							
				£680,442	1	0						£680,442	1 0

PROFIT AND LOSS, HALF YEAR ENDING JUNE 30, 1857.

Dr.				*Cr.*			
To coals		£27,037	7 4	By gas		£53,917	7 8
Lime		295	18 0	Coke and other products		14,664	9 9
Stores		1,042	11 4	Rents		420	19 0
Wages		7,524	2 2				
Wear and tear		1,957	7 3				
Royalty		562	6 3				
Meters—repairing and fixing		1,508	5 7				
Directory and auditing		530	0 0				
Salaries		1,626	5 0				
Rates and taxes		780	5 11				
Rents		692	12 0				
Commission		854	4 2				
Stationery and incidental expenses		742	18 11				
Allowances and bad debts		1,985	18 1				
Law expenses		500	0 0				
Gas supplied by other companies		270	13 11				
Depreciation		7,730	7 1				
Balance		13,361	13 5				
		£69,002	16 5			£69,002	16 5
Interest on borrowed money		£2,908	11 5	Balance brought down		£13,361	13 5
Set aside for contingencies		3,400	0 0				
Balance		7,053	2 0				
		£13,361	13 5			£13,361	13 5

DIVIDEND-FUND.

Dr.		*Cr.*	
To amount of first preference shares dividend, March 31, 1857	£4,109 5 0	By surplus profit, December 31, 1856	£9,272 4 5
Do. blue shares dividend	2,878 10 0	Balance as above	7,053 2 0
Balance	9,337 11 5		
	£16,325 6 5		£16,325 6 5

The CHAIRMAN: Gentlemen,—In moving that the report of the directors and the accounts be received and adopted, I have first to congratulate the shareholders on the very great improvement which continues to be manifest in the condition of the company. The profits of this half year are, as you have heard from the report, nearly £6000 greater than they were in the corresponding previous half year; and in that previous half year they were about £4000 greater than in the corresponding previous half year to that; and the same improvement has also been evident in the Christmas accounts for the last two half years, so that the real increase of profits for the last two years is about £20,000. I do not mean to say that the whole of that £20,000 appears as profits on your accounts, because from that £20,000, £9000 has been deducted in each of these half years to meet the depreciation of the lease, as has been mentioned to the shareholders in previous reports. But, great as the improvement of the company that is now shown on the accounts is, I believe that it has not cost the directors one-tenth of the labour, care, and anxiety which it cost them to show the very moderate improvement some years since. Those improvements some years since were in the face of falling prices and very great financial and other difficulties under which the company was labouring. We are now labouring for profit; we were then labouring for existence. The next important thing I have to mention to you is the operation of the Act of Parliament. You all know that an Act of Parliament has passed, and you all know what we meant to do by it; but I believe all do not accurately know what the operation of the Act will be. It will, in reality, take effect from the 1st of January next. What I mean to say is this, that in calculating the amount of stock to be given to the holders of blue and red preference shares in lieu of their arrears of dividend, and in calculating the amount of stock on the blue shares, it has been assumed that a dividend at the rate of 6 per cent. would become due to the blue shareholders on the 15th of January next, though that amount will be deferred, as we always have done lately. We have, for a very long time, as you know, deferred the payment of dividends on our shares from the day at which they were due, namely, the 15th of January and the 15th of July in every year, to the 15th of June and the 15th of December in the same year; thus gaining nearly five months. It is not our intention to gain as much as that in future, because we believe we shall be able to pay our dividends some two months earlier. Our present intention is to declare a dividend on the blue shares for the next two half years, so as to make them payable at the same time with the dividends on the first parliamentary preference shares. You will understand, therefore, that the first payment of dividend on the new stock which has been created, both on blue and red shares, and also the first payment of dividend on the red shares themselves, will take place out of profits of the half year ending June next, the new state of things beginning in January next. The next question which arises is, whether we are likely to have profits to enable us to pay the very large amount of dividend that is now thrown upon us. We are to pay first, interest on our debt, then dividend on our first parliamentary preference shares, then on our blue shares, then on our red shares, then on the blue stock, then on the red stock, and then to lay aside £1500, which we are required by the Act to do in every year, towards reducing the stock which is now created, so as, in a certain series of years, to pay off that stock, and release the company from the additional capital thrown upon it. In order to do that, it will take nearly £26,000. Now, in the year that has just passed, our profits, after having written off a very large amount to depreciation, which we do write off, namely, £15,000, have amounted to about £26,000; and, therefore, if we continue to improve at all, we shall not only be able to pay the whole of these dividends, and lay by this sum towards reducing the stock now created, but that improvement will go to the benefit first of paying off the interest on the shares that were created in 1845. I believe many shareholders know that there is a certain sum of interest amounting to about £3000 due to those persons who paid up instalments on the shares created in 1845. The company guaranteed the payment of that interest, and as soon as they have the means of paying it, that interest must be paid; afterwards, all profits will be available for the original shareholders. Now, we have very good reason to believe that our profits will not remain stationary where they are now. As I have just shown you, they have increased in the last two years £22,000. They will not increase anything like at that rate in future, because we had a good deal to make up, and our previous years since the present board was formed have been taken up in bringing the company into a condition so as to enable it eventually to make this increase of profit. That we have now done, and though there is much more to do, there is not so much room for improvement as there was two years ago, but we have no doubt that there will be a considerable increase of profit. You will have noticed that in the last half year and this we are writing off a considerable sum for contingencies. We do not need that sum to divide, because we are enabled to pay our 6 per cent. to the blue shareholders without making use of that sum for dividend. Under our Act of Parliament we cannot pay dividends on the other classes till after January next, and, therefore, we do not actually want that sum for dividend; and, by carrying it, as we have done, to the contingency-fund, we are enabled to release the company from many annual writings off which up to the present time have been charged upon it. I had better explain this. Some years back, at a time when our works were in a very dilapidated condition, it was necessary to put works, and different buildings remaining to us, and houses of which we held the leases, into repair; and it was necessary to lay out large sums of money on the property of the company, which sums did not form properly a part of the current expenditure of the half year. We therefore charged it in our accounts in such a manner as to make the expenditure run over a very long series of years. We are now using our contingency-fund in getting rid of those sums, so that we shall not be obliged, in half years that are now coming, to write off for each half year the very large sums we have hitherto been obliged to charge on the current expenses, and the sums from which the company is so relieved will become available in future for dividend. In addition to that, we have made a coal contract which will reduce the price of our coals to a certain extent; and we have done another thing, alluded to in the report, which, more than all others, we believe will tend to reduce the expenditure, and that is, we have entered into an arrangement with other companies by which each company obtains a separate district to itself. I believe you all know that, from the very commencement of our appearing before you, we have always considered it very desirable that each company should have a separate district. The leakage can be very considerably diminished, and that leakage will go to supply a large number of customers; so that the whole of the gas so saved in leakage will afterwards be delivered to consumers, without costing you one penny more. You manufacture the same quantity and deliver it to consumers, without one farthing more of expense. We also believe that a very considerable saving will be made in our bad debts; so that, from these sources which I have mentioned, we have every reason to anticipate a very considerable increase of profits still; so that, as we promised there would be when we obtained your consent to the Act of Parliament, there will be a small dividend very soon available even for the original shareholders. (Hear.) On the other hand, Mr. Wright reminds me that there are some drawbacks from these profits which we anticipate. Those who take an interest in gas matters have, no doubt, read the reports of the different companies lately pub-

lished, and they will see that they have all suffered very largely from the diminished price of products. We have also suffered largely from the diminished price of products, but we have had so much lee-way to make up that. You do not see the diminished price of products in the accounts, because we have made such enormous improvements in other things that they swell up the diminished price of products, and leave a very considerable surplus; but the price has fallen very much, and we may fairly anticipate that it will still continue to fall. The last thing I have to mention is, that there are some drawbacks to these increases, and that, great as these increases will probably be in the end, we have mentioned in the report that they probably will not take place during either the current or the next half year. The reason of that is this—the district arrangements have taken place so extremely late in this year, that we have been unable to make the alteration of mains by which this great saving of leakage will be effected; therefore it will take some time to make such alterations and calculations as will enable us to diminish our bad debts very considerably. You must, therefore, not look next Christmas for any considerable increase of profit. The great alterations that are now taking place so derange the general working of the company, that none of us can really calculate what our profits next Chrismas will be, and it would not surprise me if we had some diminution; but, rely upon it, that will not continue—it may be for a time, but it will pass over. Some of the shareholders have been anxious to know how much stock will be assigned to each blue and red shareholder in respect of his blue and red shares. The stock to be assigned to each blue shareholder is £10. 17s. 6d., and to each red shareholder £15. 15s.; the difference arising from this, that the blue shareholders have for some time been receiving 3 per cent. dividends, and latterly 6 per cent. dividends, and it is intended to pay 6 per cent. dividends to the blue shareholders out of this current half year ending Christmas; but the red shareholders have received no dividend all along, and will receive none this current half year. I now move, "That the report of the directors and the accounts now laid before the meeting, be received and adopted."

Mr. RHODES: I have no objection to second the report. I did not perceive that you read in the accounts any item for bad debts this half year.

The CHAIRMAN: Oh, yes! above £1900.

The SECRETARY: £1985. 18s. 1d.

Mr. RHODES: There was an item with reference to some unpaid-up shares; what was that?

The CHAIRMAN: I mentioned just now that many persons who took the shares which were issued in 1845 paid them up by instalments, the company guaranteeing that upon those instalments interest at 5 per cent. should be paid. At the time the dividends stopped, the whole of those instalments were not paid up; therefore there is still something due, which will be paid as soon as we can make it worth the while of persons to pay them. After the dividends were stopped on the preference shares, it would have been illegal to continue to pay interest on the instalments.

Mr. RHODES: What does the sum of £500 for law expenses arise from?

The CHAIRMAN: Every year, for many years, we have written off, first, £300 on each half year, and lately £500, to meet the expenses incident to the action between the Imperial and this company.

Mr. RHODES: What is there now unpaid of those expenses?

The CHAIRMAN: About £300 remains to be paid of the whole of the law expenses of the company.

Mr. RHODES: May I ask what is the amount of law expenses incident to the action between the Imperial and you?

The CHAIRMAN: Several thousand pounds.

Mr. WRIGHT (a director): I do not think it is to the advantage of this company to discuss that matter.

The CHAIRMAN: It is all settled except £300. You may imagine the amount has been very heavy, when we have written off £300 for several half years.

Mr. RHODES: My reason for putting the question is this:—A certain gentleman asked at the meeting of another company what the amount of law expenses had been connected with the proceedings relative to a market-gardener, and he was told the expenses were covered by what had been received from the London Company.

The CHAIRMAN: Their expenses must have been very light, that is all I can say.

Mr. RHODES: You write off so much every half year for depreciation of plant; may I ask how long you are going to continue writing off? You alluded to it in your speech just now.

The CHAIRMAN: The sums that we write off for depreciation arise from several causes. Every year we write off £10,000 towards the depreciation of our lease. The lease of our works terminates somewhere about six or seven years hence, and we are, therefore, writing off £10,000 in every year to meet the depreciation of the lease. We believe that that sum will more than do it, and will leave a surplus in hand; but we like to be on the safe side. In a previous report, which was circulated to every shareholder, it was stated that we are writing off this £10,000 every year towards the depreciation of our lease; and, as the best means of meeting the depreciation of the lease, we are expending that sum in the purchase of land elsewhere, erecting a gasholder on that land, and also have commenced erecting works there, which we shall put into operation if necessary.

Mr. RHODES: With reference to the money that the company has borrowed upon bond, is there likely to be any provision made to meet those bonds as they become due?

The CHAIRMAN: The company have power to borrow certain sums of money; and we have never had the slightest difficulty in meeting the bonds as they fall due. Mr. Rhodes, I believe, has always renewed his bonds; and whenever other parties have not been ready to renew them, Mr. Rhodes and some others have lent us the money. We have had no difficulty about that; and £1500 is now being laid aside every year towards reducing our capital. That £1500 is available, either for the redemption of the new stock now created, or paying off debts, or redeeming any other shares.

Mr. GRAY: I think there can be only one opinion among the proprietors now present concerning the able report which we have heard. It is impossible for me to express in adequate terms the high opinion I entertain of the court of directors for the trouble they have taken, and the successful issue to which they have brought us. I have no doubt that, in a very short time, the original shareholders will receive a dividend. It is not owing to any mismanagement on the part of the directors that that happy consummation has not arisen before. I believe no gentlemen have had greater difficulty to contend with than my honourable friends; but they have steered clear of those difficulties, and have brought the ship into such a situation that I believe we shall go down the stream with well-filled sails. The parliamentary arrangement is a desirable one in every respect. It gives entire satisfaction to parties who were formerly very much dissatisfied; and I think it was a wise discretion on the part of the directors, that instead of seeking the interference of Chancery, they took upon themselves, with the concurrence of the proprietors, to settle the matter without the intervention of that court. I know what the consequence would have been if you had got there. You would have seen no end to your troubles; one difficulty would have followed another; and happy is the man who can keep out of such a court as that. (A laugh.) With respect to the district arrangements, I think nothing is more likely to conduce to your welfare than that arrangement. It may not be in the recollection of any gentleman present, but that was a scheme submitted to the gas companies that were in existence in 1823, and why it was not carried into execution I cannot tell; but when Sir William Congreve found that the Government would not pay him for his trouble, the thing fell to the ground. The condition was, that an Act of Parliament should pass, carrying the arrangement into full execution. That was not done, but the good sense of the companies on the south and the north suggested to them that it might be accomplished by mutual arrangement; and my honourable friend has very clearly stated that a very great saving will be effected in the expense. That there can be no doubt about; but if a great saving should not result, the public will derive considerable benefit from the arrangement, inasmuch as, instead of the streets being constantly disturbed by two or three competing companies, in the event of any escape of gas, the company in possession of the street will find it out without any difficulty. There will also be a very great saving in your leakage; as has been stated with very great propriety, the subsidence of a street very often disturbed causes a considerable leakage in consequence. All these difficulties will, I think, hereafter be obviated. I consider it due to my honourable friends to express my approbation of the report. I consider the accounts are most satisfactory, and I hope that at our next meeting a better profit may appear; but upon that point I am not sanguine, for there are difficulties to encounter. One arises from the depressed state of the coke market, that may be compensated by the less cost of coal; but I fear we must anticipate, for some time to come, that the coke market will not be in the state in which it formerly was, when coke realized a very considerable portion of the cost of coal. In conclusion, I beg to express my cordial satisfaction with the directors.

Mr. RHODES: I did not like to ask the leakage this half year, because I thought it would not be prudent, on account of the alterations you are making.

The CHAIRMAN: Our leakage is very small this half year—not above 26 per cent. It is always a difficult question, because different companies calculate their leakage in a different way. Assuming we deliver 20,000 cubic feet to every public lamp, and take the whole rental at 4s. 6d. per 1000 cubic feet, it is about 26 per cent.; but that is not such an amount of leakage as we hope to arrive at when we get a separate district. Mr. Jones (the engineer) assures us that the leakage will be very considerably diminished; and that the whole of that which is passing as a public nuisance into the streets will be delivered to consumers and paid for.

Mr. DEELEY (auditor): When I addressed you on the subject of the arrears, the answer you returned was, that, from what you know of the arrears, you were enabled to state that they are good. I think it would be more satisfactory to the meeting to hear that from you.

The CHAIRMAN: Either our accounts are untrue, or else we believe that each year we write off an ample amount to meet them. What you are alluding to is the arrears of bad debts. We have reason to believe that what we write off each half year is ample. The last two or three half years have been particularly large. I think the bad debts will diminish enormously.

Mr. DOWNS: I see you are putting up a new purifying house near where the ovens where. Is that leasehold, or ground which the company has bought?

The CHAIRMAN: It is on ground of which the company have a very long lease. The company, as you know, was prosecuted a short time ago for a nuisance, and it was necessary to do the utmost that could be done to prevent the slightest inconvenience to the neighbourhood; and we believe that when that purifying house is erected, and the other alterations made, which have not yet been made on any gas-works, the works will be conducted so as to be as little offensive as this room. I believe gas-works ought to be no more offensive.

Mr. DOWNS: I do not think we have much to find fault with as to the offensive character of the works now; for, whenever I have been there, I have considered them particularly sweet. The only reason of my putting the question was, that I wanted to know whether the ground was leasehold or not.

The CHAIRMAN: We could not purchase the ground. It was in the hands of trustees; but we have got a long lease, with an undertaking to renew it from time to time.

The resolution for the adoption of the report and accounts was then put, and carried unanimously.

The CHAIRMAN: I should just like to say one word more, because all the directors wish that it should go forth to the public. There has been some apprehension on the part of the public that the districting arrangements carried out between the companies have had for their object an increase of price. That is not the fact. I know with regard to ourselves that we do not contemplate it, and I believe no other company contemplates any increase whatever of price. So far from that, the public will be benefited; for supposing the district arrangements had not taken effect, the diminution in the price of coke was so great, that the companies might have been driven to increase the price. They believe the districting arrangements will prevent that altogether, and the public will gain in addition the advantage of not having the intolerable annoyance of the leakage of gas every time the streets are opened, which is so excessively offensive, and which would not occur if one company only was there.

Mr. GRAY: Would it be attended with any inconvenience to the company to have the accounts printed and circulated a week before the meeting? The accounts are made up to June, and now it is October. I think it would place the proprietors in a better position to discuss any point if that were done.

The CHAIRMAN: Is it usual in other companies?

Mr. GRAY: Yes. I should be sorry if it were supposed that I cast any reflection on the company; but other companies, with very few exceptions, do it, and I do not see why this company should not do the same. No disadvantage could arise from it.

The CHAIRMAN: We will do it if the proprietary wish it. Give us another half year, till we get into order. I have not the remotest idea what effect this districting will have on the half year. Things are so completely changed, that neither Mr. Jones nor myself can calculate what our profits will be. I have not the remotest idea whether they will be more or less this next half year.

Mr. GRAY: The amount of profit does not interfere with the principle—you will send out the accounts precisely as they are; but I am willing to leave it with the directors.

The CHAIRMAN: Give us time to consider it.

Mr. GRAY: Very well, I am quite ready to do so.

The CHAIRMAN: If there is a general feeling among the proprietors that it should be done, it can be done.

Mr. RHODES: I think the better way will be to leave it with the board; and, if they can do so before the next meeting, it will be a sort of bonus to us.

The CHAIRMAN: Very well.

Mr. GRAY: I quite accede to that. In the few observations I felt it my duty to make, I paid a compliment to the directors, because I thought they were deserving of it; but I should like to know whether the proprietary take the same view, and therefore I submit, that the conduct of the directors has been highly satisfactory to the proprietors, and we hope they will continue their exertions to the increased prosperity of this company.

The resolution having been seconded, passed *nem. con.*

The CHAIRMAN: On behalf of the directors and myself, I have to thank you for your kindness; and we are very glad that things have so changed that we can meet you with smiling faces. You, however, treated us kindly, and supported us, too, when things were not so prosperous as they are now, and we have to thank you for so doing. (Applause.)

A vote of thanks to the auditors passed unanimously, and was acknowledged by Mr. DEELEY.

Mr. Jones, the engineer, was paid a similar compliment, which he suitably acknowledged, the CHAIRMAN stating that he entirely concurred in it, and acknowledging the valuable services which Mr. Jones had rendered the company.

A vote of thanks was cordially voted to the secretary for his untiring zeal in the company's service.

Mr. GRAY suggested that the most substantial way of expressing their sense of the secretary's services was to increase his salary.

Mr. HIND: I can assure you this expression of your approbation is quite unexpected, and I can only beg to assure you that I have laboured, I hope with some degree of attention, to get you through troubled times. I have been with the company now 22 years, and have seen a good deal of trouble; but, in my humble estimation, you have pretty well weathered the storm. The opinion which has been expressed is exceedingly gratifying to me; and I beg to thank you for your kindness on all occasions. As to remuneration, I have only to say that I shall not be at all dissatisfied if you leave me where I am. (Applause.)

The meeting then separated.

SOUTH METROPOLITAN GASLIGHT AND COKE COMPANY.

The Half-Yearly Meeting of this Company was held on Wednesday, the 14th inst., at the London Tavern—T. B. SIMPSON, Esq., in the chair.

The minutes of the previous meeting having been read and confirmed,

The SECRETARY read the annual report:—

The directors have much pleasure in meeting the proprietors with such a report of the company's proceedings for the past half year as they hope will receive their approbation.

By the accounts which are now before the meeting it will be seen that the rental for gas and receipts for products, &c., for the half year to June 30 last, amount to £29,622. 2s. 2d., and the expenditure for the same period to £23,308. 16s. 2d., leaving a balance of £6313. 6s. as the profit for the half year.

It is very gratifying to the directors to be enabled to report that the consumption of the company's gas is steadily increasing, and that the rental for the last four quarters is nearly £4000 in excess of the year preceding. It will, doubtless, also be satisfactory to the proprietors to hear that the chemical referee continues to report the quality of the gas to be considerably above the parliamentary standard, and, as regards purity, always free from ammonia and sulphuretted hydrogen.

At the meeting in April last the directors reported that much difficulty had occurred in completing the new tank, and that they had considered it advisable to arrange with the contractor to give up the work. They have now much pleasure in stating that the tank has been completed in a most workman-like manner, by the energy and attention of the company's officers, at a very small additional cost beyond the original outlay. The gasholder has also been constructed on the best and most approved principles, and the whole is now in work to the entire satisfaction of the directors.

The other parts of the company's establishment are in sound working condition, and it is believed are of sufficient capacity for a large extension of business without any material outlay.

In conclusion, the directors beg to recommend that the balance to the credit of the working account should be appropriated, by the declaration of a dividend of 3 per cent. for the half year, amounting to £3600; by the payment of a bonus of 7s. per share, amounting to £1400; by carrying to the credit of the reserve fund £1000; and by placing the balance of £313. 6s. to the credit of the wear and tear account.

The CHAIRMAN: Gentlemen,—I have very little to add to the particulars which are contained in the report. It is very satisfactory to the directors that they have to announce to you that the great difficulties which they were in at the last meeting, and which threatened to be of very great importance and very expensive to the company, through the failure of the contractor, have been overcome, and that we are subject to very little cost beyond the price that was originally fixed. For this we are indebted, in a great degree, to the exertions of the officers, and I cannot speak too highly of our excellent secretary, whose exertions on that occasion were beyond praise. But when a concern like ours is going on well and prosperously, there is little to say respecting it, and I shall add no more, except to say that I am sure the report which has been read to you will be deemed a very satisfactory one. I now move, as a matter of form, "That the report just read be received and entered on the minutes." If any gentleman has any observations to make respecting it, we shall be happy to hear him.

Mr. GRAY: I am invited to make any remark that occurs to me on the report, but really it is so excellent in itself, that it defies all criticism. This is my first appearance here as a proprietor, as it so happens that the meeting of another company at the same time prevents my attendance; still, I have watched the progress of this company, and it appears to be advancing in a steady course of prosperity, without exciting the envy of its neighbours, or doing anything to damage its own character. I have much pleasure in expressing my satisfaction at the state of the accounts and the able report which has been submitted, and also at the manner in which the interests of the company are watched over by the directors; and I should like, at a future period of the meeting, to propose a vote of thanks to them.

Mr. RHODES: I think you have not said much in the report respecting the depreciation of the products.

The CHAIRMAN: Really there has been so little falling off, that there is not much to say about it.

The SECRETARY: We have kept up a better price lately; there has been some falling off, but not worth mentioning. We have had a good price all this year.

Mr. RHODES: I think the depreciation is partly caused by the cheap coal—the Yorkshire coal—coming to London. The poor people prefer the Yorkshire coal to the coke coming from the gas-works. There is nothing particular to comment upon in the report, as it is very satisfactory.

The CHAIRMAN: I am sure it must be very satisfactory to the proprietors to hear a gentleman standing so high as Mr. Gray does, the chairman of a sister undertaking, speak of the management of this concern in the way that he has done. It must be not only satisfactory to the proprietary, but it is very kind and complimentary to the directors.

The motion passed unanimously.

The half-yearly accounts were then read as follows:—

Dr. WORKING ACCOUNT, FOR THE HALF YEAR ENDED JUNE 30, 1857. *Cr.*

To amount paid for wages			£3,891	14	8	By gas rental—	
Do. for salaries			916	15	0	March 31	£15,321 16 0
Do. for directors and auditors			385	10	0	June 30	8,951 7 9
Do. for lamps and lamplighters			1,281	0	9	Sundry products	5,053 6 2
Do. for rent and taxes			718	13	1	Rent of meters, &c.	295 12 3
Do. for purifying materials			336	18	0		
Do. for sundries			1,053	14	5		
Coals carbonized			11,310	9	9		
Wear and tear of retorts			515	12	6		
Main-pipes laid and repaired			1,334	10	1		
Service-pipes laid and repaired			385	10	4		
Meters fixed and repaired			774	4	5		
General stores used			179	14	9		
Bad debts and allowances			224	8	5		
Balance			6,313	6	0		
			£29,622	2	2		£29,622 2 2

Dr. BALANCES, AS PER LEDGER, TO JUNE 30, 1857. *Cr.*

To capital			£120,000	0	0	By amount expended on works		£100,144	12 10
Dividend unpaid			128	12	1	Stock of coals	£3,406 17 11		
Payments in advance for gas			130	18	7	Do. of coke, &c.	95 8 0		
Sundry creditors			1,629	10	3	Do. of retorts, &c.	1,439 14 10		
Reserve-fund			732	3	6	Do. of main-pipes	616 7 0		
Working account			6,313	6	0	Do. of service-pipes	231 19 0		
						Do. of meters, &c.	929 19 2		
						Do. of general stores	952 17 5		
							7,673	3	4
						Amount due for gas	£12,569 15 5		
						Do. for coke, &c.	167 4 0		
						Do. for sundries	341 0 11		
							13,078	0	4
						Cash at bankers	£7,960 18 2		
						Do. in hand	77 15 9		
							8,038	13	11
			£128,934	10	5		£128,934	10	5

The CHAIRMAN: I now move, *pro forma*, "That the accounts to the 30th of June last be received."

Mr. RHODES: I second that.

The CHAIRMAN: I have now the pleasing task to offer a motion for your consideration, which I have no doubt will be passed unanimously, "That a dividend at the rate of 3 per cent., clear from the property tax, be declared from the half year ending June 30, and that the sum be made payable, with a bonus of 7s. per share, at the company's bankers on and after the 21st instant."

Mr. RHODES seconded the motion, which passed unanimously.

The CHAIRMAN: That, gentlemen, concludes our business, and I thank you for your attendance to-day.

Mr. EDGINGTON: Before the meeting closes, permit me to express, as an auditor, my great gratification at the correct manner in which the accounts are kept, and my great delight at the prosperity of the company under your superintendence and direction. There is only one thing that I have upon my mind, and really upon my conscience; therefore I hope you will excuse my mentioning it again—I have alluded to it on a former occasion. It is in regard to the workmen, who, in these days of our prosperity, are working on the Sunday in the works, and have not an opportunity of attending a place of worship from one year's end to the other. I think we ought to consider the lesson we have lately had in England. For the want of promoting Christianity to the best of our ability a visitation has come upon us; and it may be the same with this company, unless you take the matter into your hands, and allow the people to worship their God on a Sunday. I would, if permitted, move a resolution that the directors be respectfully requested to take the matter into consideration, with a view of bringing about that result.

The CHAIRMAN: I can assure you this is a subject which has continually

occupied the attention of the directors,—how to steer a course that is prudent and wise with regard to the workmen. It is very difficult indeed to say what is best to be done. We have given them the opportunity, and have offered them holidays; we have thought very seriously about it, whether we would not give them half their wages to induce them to take a holiday on Sunday. We must have men at the works, and if we give them a holiday we must have other men in their place, for gas is required on Sunday as well as on other days. There is a great difficulty how to manage it; we have given the men opportunities, and we have stated that we are not only desirous that they should attend church, but that we hoped they would do so. They almost universally declined; and even if they do take a holiday they only come and hang about the manufactory, and never go to a place of worship. It is difficult to know how to deal with the matter; we cannot force the men to go to church; we entice them by every allurement we can offer; and we shall be very happy to assist them in any course they themselves can propose, by which to relieve them from the labour of Sunday. You all know, however, that gas is required to a certain extent on Sunday as well as on other days—the public lamps, for instance, must be lit.

Mr. GRAY: There is no doubt that my worthy friend is actuated by a very proper motive, but it is difficult to carry his intentions out. No doubt if these men would go to church, a part of them might always have a holiday; but you must have a certain number to supply the gas on Sundays as well as on week days. But if you were to hold out any pecuniary inducement to these people to go to a place of worship, the probability is, that, instead of going, they would lay out their money in the publichouse or some other place of that kind: you must leave these matters entirely to their own discretion. I sincerely hope they may be induced to do that which all would look forward to with the greatest satisfaction, for they would no doubt hold a better position in society than they do at the present time; but by attempting to coerce them you would defeat your own purpose

Mr. EDGINGTON: I am quite sure the chairman will excuse me for giving utterance to my sentiments; they are from conviction. Our secretary has told me that, for the small sum of £130 per annum, or thereabouts, he could arrange the matter; therefore, when we are receiving bonuses and good dividends, if, for the sake of that small sum, we do not allow the people the opportunity of going to church, I think the sin will lie at our door. The chairman has spoken of the people hanging about instead of going to church; but let us do our duty, and then we may hope that they will do theirs.

Mr. GRAY: What course would you adopt? If the object could be obtained for £130 a year, no proprietor would object to it.

The SECRETARY: The only course that could be adopted would be to give a certain number a holiday on Sunday, and pay them: not one of them will take a holiday if he loses his day's pay. We must have a certain number of men to take their place on Sundays, if they have a holiday.

Mr. GRAY: That does not meet the difficulty; you only give the people an opportunity of absenting themselves from their work, taking your money, and laying it out in ways not beneficial to themselves. The only way would be to have a place of worship on the premises; and then there would be a difficulty, because one would like to go to a dissenting place, and another to the Established Church; another to a Roman Catholic chapel; and so there would be great disorder. You must, I am sure, leave the matter to the men themselves.

Mr. RHODES: Do you require the same number of men on Sundays as on working days?

The SECRETARY: Exactly the same; we could not do with less.

The CHAIRMAN: We fully appreciate Mr. Edgington's view of the matter, and we have discussed the subject over and over again.

Mr. RHODES: I live in the neighbourhood of some powder-mills, and there I scarcely ever see any of the men going to a place of worship, but they idle about all day on Sundays. I have said to some of them, "Why don't you go to church?" but the reply has been, "I had rather go and work in the mill."

Mr. DREW: I can mention a similar case. There were some railway works close to my house, and I proposed that the men should have a distinct service in one of the churches in the neighbourhood, the use of which I should have been able to get. I made inquiries about the matter, and I found the men would not go, principally because they fancied their clothing was not sufficiently good to go to church in. I then applied to Sir Morton Peto, who managed the railway, and he sent a scripture reader, and erected a place for them, and then they went to church. That was the only way in which it could be done. Our people are principally Roman Catholics, and we should be obliged to get a Roman Catholic chaplain and service.

The CHAIRMAN: We could not adopt that course. Those men were idle on the Sunday; our men are at work.

Mr. GRAY: I now refer again to the subject which I mentioned earlier in the meeting, and beg to propose a vote of thanks to the directors, for the able manner in which they have managed the business of the company.

Mr. RHODES: I second the motion.

The motion passed unanimously.

The CHAIRMAN: I am sure it is very pleasing to us to receive your thanks on this occasion. I assure you you do us justice in regard to our desire to serve the company to the best of our ability; and so long as we receive your countenance, depend upon it we shall never lose an opportunity that we think will benefit the company with regard to either the pecuniary or the moral management of it.

Mr. GRAY: The report called attention to the completion of the tank, and to the fact that the company was very much indebted to the practical exertions of the officers on that occasion. I think some little gratuity should be made to them for their services. I do not make any specific motion, but I leave it to the directors.

The CHAIRMAN: We did what our secretary recommended.

Mr. GRAY: I now propose a vote of thanks to our worthy and excellent engineer and secretary. There is no company in the metropolis that has a better officer than our worthy friend who takes the management of this concern.

Mr. EDGINGTON seconded the motion, which passed unanimously.

The SECRETARY acknowledged the vote of thanks, and the proceedings terminated.

THE MARYLEBONE VESTRY ON THE GAS QUESTION.

At the Meeting of the Marylebone Vestry on Saturday, the 17th of October, held at the Court House—Mr. Churchwarden SODEN in the chair—

Mr. GREENWELL, the vestry-clerk, read the following communication from the Equitable Gaslight Company in reply to a communication they had received from him in his official capacity, inquiring whether the company would be prepared to continue their contract for lighting that portion of the parish of Marylebone now lighted by them.

The Equitable Gaslight Company's Office, 21, John Street, Adelphi, Oct. 16, 1857.

Dear Sir,—I beg to acknowledge the receipt of your favour of the 9th instant, stating that you are directed by the vestry to inquire whether the Equitable Gas Company will be prepared to continue their contract upon the present terms.

I beg to acquaint you, your communication has been laid before the board of directors of this company, who have instructed me to inform the vestry that they will not be in a position to continue the lighting of your lamps after the expiration of the existing contract.

I am instructed to express the gratification it affords my directors to be thus made acquainted of the desire of the vestry to continue this company's contract, as affording (in their opinion) the best evidence of their having performed it to the satisfaction of the vestry.

I should be unmindful of my duty if I omitted to express the best thanks of myself and the officers of this company for the courteous reception they have always experienced from yourself and your surveyor in our intercourse on business matters.

I am, Sir, your most obedient servant,

SAMUEL ANDREWS, Secretary.

W. E. Greenwell, Esq., Vestry-Clerk, St. Marylebone.

The reading of this communication created a considerable sensation, and no small amount of astonishment, in the vestry.

Mr. HODGES and several other members rose at the same moment; but Mr. Hodges caught the eye of the chairman, and was called on to speak. He said: I think the vestry will agree with me that this is a most important as well as serious question to this parish. If I understand the letter which has just been read rightly, it is, that the Equitable Company state that they are not disposed to renew their contract with this parish. (Hear, and "No, no.")

Mr. GREENWELL (vestry-clerk): No, they do not say that. The words in the letter are that they will not be in a position to continue the lighting of your lamps after the expiration of the existing contract.

Mr. HODGES: Well, it amounts to very much the same thing; and there is no doubt but that this is the result of the amalgamation or arrangement amongst the gas companies for parcelling out the metropolis into districts; and it would appear that it has been done between the Equitable Company and other companies without any reference to this vestry or the consumers of Marylebone. (Hear.) It appears to me that in this matter either this vestry, as the representatives of a great district, have been guilty of very great remissness or neglect in permitting these gas companies to pass a bill through the House of Commons, giving them power to amalgamate their companies and parcel out the metropolis just as they please, without asking the consent of the consumers or any one else, or else that baneful system of legislation has been adopted in this instance by which a bill has been quietly smuggled through the House at the end of the session, after midnight, permitting this amalgamation to take place.

The CHAIRMAN: Let me correct the honourable member: the companies did not go before the House of Commons.

Mr. HODGES: Then I think it is a great pity that this vestry, and other public boards in the metropolis, have not been more alive to the interests of the public than to have quietly permitted this parcelling out of the metropolis to take place. It appears to me that we are now, to a very great extent, at the mercy of the gas companies; and we in Marylebone are in this unenviable position, that, as the Equitable Company have declined to light that portion of the parish which they have hitherto lighted after their contract at present in existence has expired, we do not know into what company's hands we are destined to be placed. (Hear.) I believe there has been a committee appointed already with respect to the lighting of this parish. (Hear.) That being the case, I am of opinion, Mr. Chairman, that that gas lighting committee should be called out without delay, and that it should take some steps to prepare a plan for presentation to this vestry, by which we may be enabled to defeat the steps taken by the gas companies for the purpose of enabling them to do as they like, charge what they like, and perpetuate their monopoly. It will, I think, be the province of the committee to draw up some plan, as I understand we have powers under the Metropolis Local Management Act, to take the lighting of this parish entirely out of the hands of any of the gas companies. There is no reason in the world, and it is farcical to say that such steps cannot be taken in Marylebone for the manufacture and supply by this vestry to the parish of its own gas. The principle is carried out at Manchester and Bolton, and other provincial towns and cities, and the profits arising from the manufacture and sale of gas by the local authorities produce a profit which is applied in the liquidation of, and relieves those districts to a great extent of, their local burdens. I think that this letter from the Equitable Company should, in the first place, be referred to that committee, and that they report thereon, as well as to the steps which they consider this vestry ought to take in the emergency. (Hear, hear.) I move, Mr. Chairman, "That the letter read from the Equitable Company by the vestry-clerk be referred to the gas committee, and that they be requested to report thereon without delay to this board."

Mr. WINGFIELD seconded the resolution. He said, I quite agree with Mr. Hodges that no time should be lost in taking some steps in this matter. We are now at the mercy of the gas companies more than ever.

Dr. BACHHOFFNER: I have much pleasure in giving my support to the motion of Mr. Hodges, as I think that no time should be lost in our ascertaining, as far as possible, the position in which this parish is likely to be placed by these proceedings on the part of the gas companies, and especially by the Equitable Gas Company declining to renew their contract. What I said in reference to the appointment of this committee on a former occasion I now repeat, namely, that I think that some definite line of action should be marked out for that committee. (Hear, hear.) A line of conduct with a view to see what can really be done with regard to the proceedings of the existing gas companies. As far as I can understand the parcelling out of the metropolis into districts by the gas companies, its effects will be to place us completely at their mercy. (Hear, hear.) Already the thin end of the wedge has been put in with regard to the great establishment of which I happen to have the control (the Colosseum). We have there, in consequence of the change which has taken place in handing us over by the one gas company to another without our consent, already began to feel the effects of a want of competition; and the subject is one of the highest importance not only to Marylebone, but to every district of this metropolis. It is quite clear that it is a subject which will not only affect private consumers, but large districts like that of Marylebone generally. We have now seen its effects so far as the lighting a portion of this parish is concerned, the only district in which we have had anything like competition. The arrangements, have been made and agreements signed, for parcelling us out into districts between the Imperial, the Equitable, the Chartered, and the London Companies, and I believe also the Western Gas Company; and, under that agreement, the Equitable Gas Company dare not renew their contract with us for lighting our public lamps or private lights in any portion of that district for which their contract at the end of the year expires. The committee should be called out forthwith

to consider this letter from the Equitable Gas Company; and I again say that their powers should be defined, so that they may know how far they may go with respect to arrangements for the supply of this large district with gas lighting for the future.

Mr. BRIDGMAN: The question is, are these lamps, which are now lighted under their contract with the Equitable Company, to be permitted by the vestry to go out, or are we to advertise, and see if some other gas company will not contract to light the public lamps of the district now lighted by the Equitable Company? Whatever arrangements may have been come to by the gas companies of the metropolis as to parcelling it out into districts, and whatever may be said by the gentlemen of this and other boards about the gas monopolies, it is no use for us to be taking steps which will deprive any portion of this parish of light. Whatever may be our opinions upon these recent proceedings of the gas companies, we must not allow our streets to be placed in utter darkness. (Hear, hear.) It will be, therefore, one of the duties of this gas committee to recommend to the vestry that we advertise without delay for tenders from some other gas company to light that district about to be relinquished by the Equitable Company, or take some steps for securing a light for the same. (Hear, hear.)

Mr. WINGFIELD: I suppose we shall have to fall back upon the Imperial, who have before told us that if we dared to allow the mains of any other company to be laid down in Marylebone parish they would refuse to light us altogether. We seem to be in a very nice fix, and no time should be lost in ascertaining what can be done.

Mr. GREENWELL (vestry-clerk): The only companies which are at present competing in this district, now lighted by the Equitable, are the Equitable and Chartered companies. The Imperial are not empowered to light that district by their Act of Parliament. The Imperial Company did not go so far as to say, if you allowed any other company to lay a line of mains in the parish, they would refuse to light the parish altogether. There is, I think, but little doubt that, if the Equitable do not consider themselves in a position longer to supply gas for the district now lighted by them, the Chartered Gas Company will take you.

Dr. BACHHOFFNER: That is all very well. There is no doubt but that the Chartered Gas Company will take us, but we shall be so much at their mercy, that if they choose to charge us at the rate of ten shillings per 1000 cubic feet, we must pay it. (Hear, hear.) I therefore say, you should not only refer this communication to the committee, but at once declare what you will do, and what powers you will give to the gas committee.

Mr. TAVENER: I think it will be premature for this board to say what they will do to-day. I think that all the ends will be fully answered by the whole subject being referred to the committee, who will consider it and report.

Mr. WINGFIELD: I hope that the committee will meet immediately.

Mr. BELTON: Will it not be perfectly farcical, Mr. Chairman, to be advertising for tenders for contracts for lighting this district, about to be relinquished by the Equitable Company, when we know that we are so in the hands of these monopolizing gas companies that we can only have a tender from one company, and that they can put in a contract just at what price they please? I have always repudiated the practice of advertising for gas contracts in this parish, knowing how unfortunately we are situated; and I look upon it now as I have always done, as a complete waste of the ratepayers' money. There can be no doubt, as Dr. Bachhoffner states, that the gas companies have got in the thin end of the wedge, and that ere long we shall feel the effects of this amalgamation, by having either a large deterioration in the quality, or a rise in the price, of our gas. The only remedy for the abuses which we are likely to suffer is to put ourselves in communication with the other local boards of this borough, or of the northern side of the metropolis, and take steps for erecting our own gas-works, and giving a supply ourselves to the consumers, in the same way that we find it is done in certain country towns. (Hear.) I know that the gas companies consider themselves secure from this, and secure from competition, because they say that the sanitary laws will prevent us erecting gas-works, and thus create a nuisance. In answer to that, I have to say that there are spots close to where their own nuisance of gas-works already exist, and where an additional set of gas-works will not materially alter or affect the condition of such locality from that in which it is at present, and, therefore, they need not be too sure about that. These suggestions about Bolton and Manchester, coming from Mr. Hodges, are all very well, but I say that the vestry of Marylebone have brought this state of things upon themselves; they have had persons in this board who have pandered to the Imperial and other gas companies, and by whose instrumentality companies have been refused permission to come into this parish and lay down their mains, although they have been prepared to enter into a bond not to amalgamate with any other company, but to give the consumers the advantage of fair competition. (Cries of "Name, name!") He would name the Western Gas Company. (Oh, oh!) The Western Gas Company offered to come in and light Marylebone — (No, no)—and give a bond that they would not enter into a combination with the Imperial or any other company; and, inconsistent as it might appear, they found Mr. Hodges voting, on the confirmation of the minute, against the Western Gas Company being permitted to come into that parish. (Hear.) Mr. D'Iffanger, jun., did the same thing, and their present position with regard to the supply of gas was the dilemma into which these gentlemen had brought the parish into by their refusal to allow the Western Gas Company to lay their mains throughout the parish. With these facts before the vestry, I cannot see how the gentlemen I have mentioned can rank themselves amongst the opponents of these monopolizing gas companies. ("Hear, hear," and laughter.) I hope that we shall be able to do something to get rid of them altogether, and then I am sure we shall be able to supply gas at a much cheaper rate than the public obtain it at present. (Hear.)

Mr. D'IFFANGER, jun.: As I have been personally alluded to, and held up to opprobrium by the observations of Mr. Belton in respect to my vote about the admission of the Western Gas Company into this parish, I think the vestry will agree with me that I have a right to defend myself from the imputation that I have done anything by that vote tending to injure the ratepayers and gas consumers of this parish. (Hear, hear.) It is not true that I voted against the Western Gas Company coming into this parish. (Hear.) I did, however, vote against the Western Gas Company when it came out that they did not want to come in to give fair competition over the whole parish of Marylebone, but merely wanted to come in and take the lighting of that particular part only which was profitable. (Hear, hear.) They told us plainly they did not care to light our public lamps, and that they did not contemplate lighting St. John's Wood or the outskirt districts. (Hear.) No; those districts might be left in the hands of the Imperial Company, or at the mercy of not being lighted at all for aught the Western Company cared. I will never, for the sake of a little popularity, falsify my conscience; and therefore it was that I voted against the confirmation of the minute admitting the Western Gas Company. (Hear.) Had that company responded to the call made upon them to light the whole of Marylebone, and given us competition all over the parish, such a proceeding would have been equitable, and treating us honestly and fairly; but when I found that their only object was to light the profitable districts of the parish and leave the other districts, which they did not consider quite so profitable, I felt it my duty to oppose their admission at all. If the Western Company would have come into this parish as other companies had done, they would have been there at that time, and no doubt not merely conferring an advantage upon the gas consumers, but the ratepayers at large. (Hear, hear.) So far from holding me up to odium, I think the vestry will say that I, and those who voted as I did, acted perfectly right with regard to the Western Gas Company. (Hear, hear.) With respect to the position in which we are placed by the Equitable Gas Company declining to renew their contract, I quite agree that the subject should immediately become the question of consideration by the gas committee. Although I apprehend that, under existing circumstances, but little good will result from their deliberations, and that we shall have no alternative but to accept the terms of the Chartered Gas Company, or such company as may be entitled to light the district now lighted by the Equitable Gas Company under the new arrangements. (Hear, hear.)

Mr. HODGES: I should not have said anything in reply had not the observations made by Mr. Belton rendered it necessary that I should defend myself from a charge of inconsistency. (Hear.) He has insinuated that while Mr. D'Iffanger and myself are professing to be the friends of free trade in gas as well as in other commodities, that we prevented that free trade taking place in Marylebone by the vote we gave in reference to the admission of the Western Gaslight Company. ("Hear, hear," from Mr. Belton.) If I had voted as Mr. Belton had wished me to vote on that occasion—and I am free to confess that I was waited upon by Mr. Belton and a body of highly respectable ratepayers and gas consumers, and urged to vote for the admission of the Western Gas Company—I say, if I had voted as these gentlemen wished me to do at that time, I should only have been doing an act of injustice to others, without in any way benefiting the parishioners at large. (Hear.) I told Mr. Belton at that time that, after ascertaining their objects, I could not conscientiously vote for the Western Gas Company's admission into this parish. What was their proposal? The Western Gas Company did not want, and, indeed, refused, to enter into a guarantee, if we allowed them to lay their mains in this parish, to light the whole of the parish, and give us all the advantages of competition. No; all they wanted was to light what they were pleased to term the respectable portions of the parish. (Hear, hear.) They wanted to light Oxford Street. (Hear, hear.) That was, of course, respectable because it was profitable; but they did not want to light St. John's Wood. All the profitable and business streets of the parish they had no objection to light, but they would not care to light the more sequestered streets and districts. Had the Western Company come boldly and honestly forward, and shown a determination to relieve Marylebone from the despotism of the Imperial Gas Company by entering into competition with them all over the parish, then they would have found me an earnest supporter; but when they only wanted to take the cream of the parish, and leave the other districts at the mercy of existing companies, I considered it would be a gross act of injustice to the Equitable Company, to the Chartered Company, and even to the Imperial; and therefore I opposed them. What is the conduct of the Western Company on the present occasion? (Hear, hear.) I am afraid that they will be found leagued with the other companies in the parcelling out of the metropolis; and there can be no doubt, let the companies say what they like to the contrary, that the object is to compel the gas consumers to pay a better price for their gas than they do at present. I fear, therefore, that we should not have, in the slightest degree, benefited by the Western Gas Company had they been admitted—most certainly not under the circumstauces they wanted to come in; and therefore I feel now, as I felt at the time, that I was perfectly justified in the vote which I gave, and that I cannot be justly charged by Mr. Belton or any one else with inconsistency or impropriety for having given that vote. With respect to the letter from the Equitable Company, I quite agree that the committee appointed with respect to the gas shall be called together, and that it will receive immediate attention. (Hear, hear.)

The resolution was then put and carried.

DOVER LOCAL BOARD OF HEALTH.

THE LEAKAGE AT THE WATER-WORKS.

The following is the report of the Surveyor to the Local Board of Health upon the subject of the leakage known to exist to an enormous extent in the town water-works, and estimated by the surveyor himself, in a former report, at no less that 1,000,000 gallons per week:—

TO THE LOCAL BOARD OF HEALTH OF DOVER.

Gentlemen,—In compliance with your directions, by minutes under date of the 25th ult., I beg to report "as to the causes and best mode of preventing the waste" of water, which, in a former report, I estimated at 1,000,000 gallons per week.

With regard to the assumed amount of water, it will appear, on reference to my former report, to be from causes which I consider *preventible*, but there will always be a certain amount of waste in the distribution of water on a large scale.

On Sunday, the 29th ult., the smallest quantity of water noted as passing from the reservoir during one hour was 28,000 gallons. Assuming the average consumption of each house *connected* to be 7 gallons per hour (about 100 gallons per day), together with a consumption of about 2400 gallons per hour for urinals, you have a total consumption of 16,050 gallons per hour, which, deducted from the quantity expended from the reservoir, leaves 12,009 gallons waste. I conclude, therefore, that the 10,000 gallons per hour (*i. e.*, 1,000,000 gallons per week) is the amount of preventible waste.

As to the causes of the waste, it may be divided as follows:—

1. In the *distribution;* and for which the board is responsible.
2. In the *use;* for which the consumer is responsible.

With respect to the distribution, I include the supply and use of water everywhere (except the inside of private premises). In this distribution, I may mention as apparent, upon observation or simple inspection, causes of waste, viz., *leakages from hydrants*, from *flushing-cocks*, and *stopcock glands;* and from causes not apparent upon observation (but requiring examination, and somewhat complicated experiments)—defective *joints and pipes*.

As it relates to private waste, for which the consumer is responsible, I may name—

1. Waste from taps left partially or entirely open.
2. Leaky taps and fittings, and imperfect water-closet apparatus.
3. Overflow-pipes of cisterns running into drains.

The remedy for waste in those cases apparent on observation, is of course to repair them as soon as they are noticed; but in the case of defective joints and pipes, either lying on beach or permeable ground, by which the water disappears without reaching the surface, the remedy is not so direct. In this case, resort must be had to experiments in order to ascertain where the leakage exists; but the net-work system of the mains renders this operation difficult and uncertain. This system (considered by some to possess advantages in a sanitary point of view) consists in connecting the pipes, leaving as few dead ends as possible, so as to secure a constant circulation throughout. But, whatever may be the advantages of this system, its disadvantages are great, and constantly felt, whenever it is required to shut the water from any one street.

In any course of experiments made with a view to ascertain the relative consumption in certain districts, the chances of coming to any correct conclusions are also much lessened when ten cocks have to be attended to where *one* would suffice.

When *one* cock only is required, if it was found that the district was not properly shut off, it would be known at once where to look for the evil.

When ten cocks are required, if one should be imperfect—of which there is great probability, as all are so seldom in use—the difficulty is increased, as no effectual means exist for ascertaining which of the *ten* cocks are in fault.

I am of opinion, therefore, that for general convenience, as well as for the furtherance of the object immediately in hand, it would be advisable to disconnect several of these junctions.

There are now about sixteen dead ends throughout the town, and, judiciously arranged, the branch system might with advantage be much more extensively adopted. At any rate, these alterations must be made before any satisfactory experiments can be conducted; otherwise, it must be *assumed* that serious leakages exist, and at once open every street, or *conclude* that the loss from hidden leakage is not worth the expense of remedying.

With respect to the waste arising on the premises of the consumers, I advise the introduction of the water-meter wherever practicable, which would be mostly in the case of large consumers, such as public works, hotels, breweries, &c., and where water is applied for any other than purely domestic purposes. The introduction of the meter would probably be of advantage both to the supplier and the consumer, and should be satisfactory to all parties, as in that case no one would pay but for what he received, and any party inclined to waste, or to apply water for the purposes of ornament or luxury, might do so at his own expense. The board would also be relieved of much anxiety, and their care be confined, as it should be, to the proper distribution. But as it would not be advisable to press the use of the meter upon every small consumer, means should be adopted, in such cases, to reduce the domestic waste to its minimum. The private waste, as before stated, may arise from—

1. *Taps left open.*
2. Leaky taps and fittings, and imperfect water-closet apparatus.
3. Overflow-pipes of cisterns into drains.

The first evil is one which, generally speaking, would defy ordinary inspection, and, if detected, would probably be productive of little benefit, as cutting off the supply would not be admissible where the water forms so essential a feature in the drainage of the town. It is also doubtful whether any good effect would be produced upon parties addicted to habitual waste by appealing to their sense of right and wrong; and, where the per centage that comes home to them of the expense incurred by their individual waste is so small, it would be equally useless to appeal to their pockets. A remedy must, therefore, be sought, and which to some extent may be found in throttling the passage of the water by the introduction of ferrules, or of short lengths of tube of smaller diameter. This would take the pressure off the tap whilst open, and might be adjusted so as to deliver the water at any required rate; as, for instance, with the smaller kind of houses, at one gallon per minute.

This is, of course, but a partial remedy; but, as it involves little or no additional expense, and by reducing the velocity of the water supply through the pipes, and the jerks attendant thereupon, would tend to the preservation of the taps, &c., I advise its adoption.

The same plan can be applied in the case of large consumers; but, where applicable, the meter would be best as a preventative of waste. The other causes of private waste, viz., *imperfect* apparatus and fittings, &c., can only be remedied by proper arrangement and the use of efficient articles, and their maintenance in that state.

Essential to the accomplishment of the whole is *efficient and undivided management*, with the assistance requisite for the performance of the work.

I have the honour to be, gentlemen, your obedient servant,

Sutrana Villa, Dover, Oct. 9, 1857. ROWLAND REES.

NATIONAL ASSOCIATION FOR THE PROMOTION OF SOCIAL SCIENCE.

This association, which has been founded "for the purpose of bringing together the supporters of the various efforts now being made for social improvement, and to elucidate by discussion the connexion between each, and the mutual assistance they may render to each other," held its first meeting in the town of Birmingham the week before last.

The Inaugural Meeting took place in the Town Hall, Birmingham, on Monday, the 12th inst., when Lord BROUGHAM, as president of the society, delivered an eloquent address to a crowded and most enthusiastic audience.

On Tuesday, the 13th, there was a General Meeting of the Members in the Town Hall—Lord BROUGHAM in the chair—when addresses were delivered by the president of each of the five sections or departments into which it was arranged that the business should be divided. Lord JOHN RUSSELL spoke on Jurisprudence and the Amendment of the Law; Sir JOHN PAKINGTON on Education; Lord STANLEY on Public Health; Sir BENJAMIN BRODIE on Social Economy; and the Recorder of Birmingham (Mr. M. D. HILL) on Punishment and Reformation.

PUBLIC HEALTH.

Lord STANLEY said he thought it necessary, before entering upon the subject on which he had to speak, to state that his paper was drawn up with a view to its being read before the public health department of the association exclusively—an audience most of whom, it might fairly be presumed, were to some extent cognizant of the facts and theories of sanitary science. If, therefore, to any of those whom he now addressed the details into which he must enter should seem tedious or superfluous, he hoped they would bear in mind the change which had taken place in the arrangements, and not impute to him any desire to trespass unduly upon their patience. They had met there as a conference to discuss, amongst other things, the present state and future prospects of sanitary science in England. Now, the first thing that rational men did, whatever might be the matter they had to deal with, was to define carefully, and see that they understood correctly, the terms they were about to use. What was it then, he asked, that was meant by sanitary science? They meant, as he apprehended, the science which dealt with the preservation of health and the prevention of disease, in reference to an entire community or class in that community, as contra-distinguished from medical science in the general acceptation of the term, which latter had for its study the restoration of health when lost, and dealt with the case of individuals separately. Or, to put it in another form, he would say that all physical evils to which human beings were liable might, for the purposes of the association, be classed under three heads:—First, those which, whether limited to isolated cases or widely diffused, were not preventible beforehand by any means at present known, and could only be dealt with remedially when they arose; secondly, those which, affecting individuals only, were preventible as regarded those individuals, but were not due to any general or wide-spreading cause; and, thirdly, those which affected entire districts or entire classes of men, of which the cause lay in some known external noxious agency, whether connected with occupation or locality, and which could, therefore, be removed altogether by the removal of such causes. Now, of these three classes, sanitary science (as he understood the term, the study of the public health) dealt not at all with the first, dealt but partially with the second, and mostly, though not quite exclusively, confined itself to the third. He would further note, that even with regard to diseases, of which the origin—the exciting cause—lay beyond the present reach of human knowledge, there could be no question but that their intensity, and the consequent mortality produced by them, depended, in a great measure, upon the sanitary condition of the community which they attack. The fundamental axiom which sanitarists laid down was this: that of epidemic diseases, some might be made, by proper appliances, to disappear altogether, while those that remained would exhibit a milder and less destructive appearance; and that of diseases which were not epidemic, a large proportion arose out of our ignorance of, and consequent non-compliance with, physical laws—a knowledge of which laws, therefore, would conduce directly to improve the state of the public health. It would be seen, therefore, that in such an inquiry as was proposed, there was nothing technical, nothing of which a knowledge might reasonably be considered as confined to a few, but that it was in the strictest sense a national and popular study. The knowledge which combated existing disease was rightly held to be the peculiar possession of a certain class, and from attempts at its more general diffusion probably mischief rather than good would arise; but the knowledge which warded off preventible disease from the naturally healthy, which harmonized the life of all ranks of the community with the physical constitution of our system, was one which in some degree should be possessed by every educated person. He asserted that this knowledge ought to be so diffused, because—and those most conversant with the subject would bear him out in the remark—however wide and varied the investigation into which sanitary inquiry branched out, and however numerous the points upon which unanimity of opinion could not be reached, yet the leading fundamental principles, with which alone it was necessary or desirable that most private persons should be familiar, were singularly few and simple. He said that this knowledge ought to be so diffused, not merely because in matters which concerned the public in its collective capacity, such as the cleansing of rivers, the drainage of towns, the exclusion from populous districts of noxious employments and the like, those by whom sanitary reforms are imperfectly appreciated will be found hostile on the ground of their expense; but because a large proportion of those remedial sanitary measures, which it is in the power of society to apply, are of such a nature that no police regulations, no board of health, no legislative enactments can successfully interfere to enforce them without the co-operation of the parties concerned, such (to take a single instance) as the cleansing and ventilation of private dwellings; because, let society and the law do all they can, much, probably more, would remain to be done by individuals and by families, each for themselves. In both capacities, as private persons and as citizens, this question of public health deeply affected them. Perhaps he might add that the duty of studying it was, to all thoughtful persons, enhanced by its comparatively unattractive nature. It dealt with things, not persons; or if with persons, with persons only considered in their physical relations, and without reference to the peculiarities of individual character. It did not present itself with any of the attraction and interest of historic association, for the scientific investigation of it was new even in our own day. It could hardly be said to appeal, through the senses, to the attention; for the enemy against which they contended was, in most cases, invisible. It required—more than most social science—the exercise of faith in the experience of those who preceded us, and in the conclusions to which their experience irresistibly led. But it had as one characteristic and one reward, which, he conceived, far overpassed any labour or trouble that attended its pursuit, that no kind of study so manifestly showed us the increased and increasing power which man (he spoke of the race, not of the community) possessed over his own destiny, even where he appeared most absolutely and helplessly subject to overruling external influences. That was a truth which, on the one hand, they were bound to receive with humility rather than pride, but which, on the other hand, it was their duty not to ignore. It was no light increase of their responsibility as citizens of the state and as members of the human family, to have it brought before their eyes, that those evils which some might be inclined to look upon as visitations of Providence (and doubtless, in certain cases, they were misfortunes to be submitted to and patiently endured) were really as much the work of their own hands—the result of errors, either of omission or commission—as war, or anarchy, or social tumult, or destitution arising from indolent or improvident habits. There might be some, perhaps many, to whom the old theory was more attractive than the new; to whom augmented responsibility was simply alarming, and the idea of resignation more congenial than that of resistance; but we had no choice in the matter, we could not go back. In physical science, at least, every step once gained was gained for ever, for all men, for all countries, and for all times. From knowledge to ignorance, from a state of consciousness to a state of unconsciousness, the return was impossible. Henceforth it was the law of our social existence that we must see ourselves, individually and collectively, as being of ourselves the cause of, at least, a large proportion of those physical sufferings on which most of us have been accustomed to look as a necessary though lamentable condition of humanity; and he had so much confidence in both the good feeling and the good sense of the English public (he said good sense as well as good feeling, because, when disease was in question, the safety of our neighbours was our own also), that he felt persuaded, when the truth became generally recognized, no dislike, however natural, either to private expenditure or public taxation—no mere contempt of what was new, because it was new—no distrust of theories, because they could not be verified by the personal observation of each individual—would stand in the way of those sanitary reforms being effected, the necessity of which—still, in a great measure, ignored by the community at large—was deeply and universally felt by those whose profession or whose inclination had led them to a special study of the subject. They might, indeed, be asked—or, rather, he might have been asked some years ago—"What proof have you of your leading assertion? what evidence can you bring of the statement you make, that disease is a result preventible to the extent that sanitarists allege?" His answer would be:—"We rely, first, upon inferences drawn from our knowledge of the general laws of health; and, next, on the proof of figures so simple and so conclusive as to leave no room for dispute. Take the case of two towns or two districts resembling each other in all respects except in this, that one is thoroughly drained and supplied with good and pure water, while the other remains in a state of dirt and neglect; if the occupations and habits of the inhabitants of both are the same, and the deaths in the latter are so largely in excess of those which take place in the former, and if, further, this difference is seen to disappear when both are placed in the same sanitary conditions, the test is complete, that the previou state of mortality is due to that cause on the removal of which it disappears." The same kind of evidence was to be found in the case of dwellers in model lodging-houses; though here some deductions would have to be made for the regular and more orderly habits of those who inhabited them. So, again, if a certain number of persons were taken, occupying a certain district, of a certain age, and following a similar occupation—the number being sufficiently large to neutralize the effect of any difference of constitution—and if a similar number following some other occupation, under similar conditions of age and residence, be compared with them, it was obvious that any difference between the rate of mortality in the two was ascribable to the nature of the employment or the diseases to which that led. They had thus two kinds of evidence, the one supporting the other; the one leading them to look in certain quarters for the existence of pre-

ventible disease, the other assuring them that they had found it. He need hardly mention the intimate connexion which existed between vital statistics and sanitary science. Indeed, vital statistics were the chief office, the only test of the sanitary condition of a locality. The further question might be put, "To what extent do you consider disease preventible, and what amount of existing mortality is, in the judgment of competent persons, due to preventible causes?" Science did not supply a direct answer to this inquiry, which was speculative rather than practical; but no one could suppose they had as yet reached the highest degree of public health compatible with actual knowledge. Between what they knew ought to be done and what had already been accomplished a wide difference existed. A general and rough answer might thus be given:—"We aim at reducing the number of deaths in all employments and in all inhabited localities to the level of those which occur in the healthiest occupations and in the healthiest localities." If this reduction could be effected they might fairly assume that society had done all in its power in this behalf. The average mortality of 17 in 1000 might be regarded as that which, in this island, was due to natural causes; all above that was artificial; and, as the average death rate in the United Kingdom was 22 in 1000, it was evident that that was at least five more than was necessary. That the death rate could be reduced by this number he did not say, but he did say that here they had the natural limit, the boundary of their endeavours, which, though they might never be able to reach, they might draw much nearer to. It was his wish in these introductory remarks to avoid details, and especially statistical details, which could not but be incomplete and unsatisfactory. But there were probably few persons present who were aware of the importance of the reduction of the rate of mortality in many employments to the average of all. He would take a single instance to show how vast a sacrifice of human life went on unchecked, and almost unnoticed, though plainly within the reach of society to abate. The case he referred to was that of the British army; not of regiments employed on foreign service, or quartered in unhealthy climates, but of the troops stationed here at home, in this island, under the direct control of the Executive. Taking the deaths which occurred among civilians resident in towns and within the age of military service, so as to exclude the very young and the very old, they had a yearly average of 11·9, or, in round numbers, say 12 per 1000. Among soldiers of the line in England the average was 18 per 1000, and among the guards 20½ per 1000; showing a greater mortality in the two latter cases, when compared with the former, in the ratio of 3 to 2 as between soldiers of the line and civilians, and 5 to 3 as between soldiers of the guards and civilians. Now, as he had no desire to go into particular cases, and cited the above only by way of illustration, he would not stop to inquire how much of this difference in the rate of mortality was owing to overcrowding and to deficient ventilation in barracks, or how much was owing to intemperate habits, alas! too common in the class referred to, observing only that both these causes were, though by different means, preventible causes, and that one at least lay within the direct province of the Government to remove. To this instance of mortality he wished to add one other instance, showing the average mortality in various districts of England. Taking the ages between 20 and 35 as representing the period of military service, we had throughout England, in the least healthy urban districts, an average mortality of 12 4-10ths in 1000; in the whole population, 9 2-10ths; and in the rural districts exclusively, 7 7-10ths. The Manchester Sanitary Association—an active and useful body—had drawn up a brief and popular summary of facts about life, one or two of which he would quote, stating at the same time that he had not verified them by reference to any other source of information. Comparing the mortality produced by war with that produced by pestilence, the result was as follows:—During the revolutionary war, from 1793 to 1815, a period of 22 years, 19,800 men were killed; and in the single year 1848-49 there died of cholera and other epidemics 72,180. In those 22 years of war, the wounded numbered were 79,700; in the one year of cholera, the number of persons attacked was 144,860. The document to which he alluded adds, that the annual average of deaths in England and Wales, due to preventible causes, might be estimated at 115,000. Another fact might be here noticed, which, lamentable as it was, afforded a most convincing proof of the necessity for measures of sanitary improvement. It was known that in the large towns, where the habits of urban life were most fully established, of all the children born, only about one-half attained the age of five years. The association from whose tables he had quoted estimated the deaths for Manchester and Salford in 1846 (which, however, was an unusually unhealthy year) at one-half of all under three years of age. One was willing to hope that this vast mortality was due mainly to ignorance, in a lesser degree to culpable neglect, and in rare other instances to worse causes. But those who were familiar with the history of burial clubs would not need to be told that the system which made the parent a gainer—often to a large extent—by the death of a child, had acted, most unfortunately, as a stimulus to careless and even unnatural treatment. He thought that no further proof than what he had adduced would be asked of the necessity of sanitary improvement as a measure of humanity, having for its end the saving of human life. But the question had another aspect. It used to be held as a comfortable optimist theory, by which people excused themselves from doing what they felt ought to be done, that pestilence, awful and destructive as it was, was yet a preventive check upon population, keeping it within the limits of possible existence, and thus indirectly subserving a beneficial end. To Mr. Chadwick's work, in 1842, which was a text-book of sanitary research, was due the credit of having dispelled this fallacy, and his argument on this point could not be abridged so as to do it justice. The general line of proof which he followed was this, that where the condition of public health was the worst and the habits of life most improvident, there, consequently, the increase of population took place to the greatest extent, irrespective of the means of support of those who can be brought into the world: in a word, improve the habits and increase the self-respect of the people anywhere, and you will have fewer mouths to feed and more profitable labour to supply their needs. Again, Mr. Chadwick had shown that, of all the causes of pauperism, none were more prolific than premature widowhood and orphanage. Estimating that a labouring man was able to follow his occupation until the age of 65, it was evident that his death at 45 was equivalent to a reduction of 20 years of his working time, and that his family must be provided for by the public, upon whom was thus cast the burthen of their support. The Manchester Association stated that, in the year 1842, there were 27,000 cases of premature widowhood, and 100,000 orphans chargeable to the poor-rates, from preventible causes; and they estimated the yearly cost by premature death, from lost labour, expense of funerals, sickness, &c., at £2,000,000 above that which it need be. Into all such calculations there must enter, to some extent, the element of conjecture; but there seemed no reason to doubt the general justice of Mr. Chadwick's conclusion, when he stated that the public loss by premature deaths of heads of families was greater than could be represented by any enumeration of the pecuniary burden imposed by their sickness and death; that the loss of working ability among a large class cannot be less than ten years of life; that epidemics do not diminish, but tend to increase the pressure of population; and that the younger portion bred up under noxious physical agencies were inferior in physical organization, and tended to become short-lived, reckless, intemperate, and little susceptible of moral influence. There was, therefore, something which they must feel was like an anti-climax in talking of the saving of money in comparison with the saving of life. But it was worth while to notice how Nature caused our own interests to coincide exactly with our duty. During the sittings of this society, the members would hear papers read upon each of the three following heads of inquiry: first, the actual condition of the public health, past and present; secondly, the causes which affect, whether favourably or the reverse, the causes of disease; and, thirdly, the consideration of preventive measures. He had already touched upon the first of these topics, and would now pass to the second. The causes which produced or predisposed to disease were many; but those against which sanitary precautions might be taken were easily enumerated. These were—want of drainage to carry off the moisture of the soil; the continual rising of miasma from the deposit of unremoved dirt; want of an efficient continuous water supply, whereby personal cleanliness was rendered very difficult; imperfect ventilation in workshops and places of public resort, as well as in private dwellings; the overcrowding of public lodging-houses; and the want of open spaces in populous towns—these stood foremost in the list of evils which called for sanitary improvement. The direct effect of these agencies was obvious, and needed no further mention—their indirect effect he could but briefly notice. It seemed to be a rule of almost universal application, that a breach of one physical law, as of a moral one, led to another. All must lament and deplore the great destruction of life and health by habits of intemperance; but all did not reflect upon the magnitude of one of its strongest predisposing causes, viz., that sense of depression and general weakness, demanding, and seeming to justify, the use of stimulants, which attacked those who lived in undrained and crowded dwellings. At the same time, no man now doubted the general connexion between physical purity and physical well-being; and, however much unattended to in practice, the theory was admitted on all hands. Perhaps he might go so far as to say, that there was a danger lest they should go too far, by the exclusive devotion with which the new doctrine was received, and should neglect those things which were known, in their attention to others which were as yet partly concealed, as affecting the health of the community. The restrictions which, in former times, prevailed in reference to the importation of disease was now generally decried; and though he had not the presumption to express a decided opinion upon a subject which divided the public mind, he would say, that he believed the time had hardly yet arrived when nations could be expected to pronounce a definitive judgment upon the extent of communicable disease. The test of experience was wanting; and until our future course was more understood, and till we could criticize the policy of the present time with the same accuracy that we could that of former days, it was wise to acquiesce in any restrictions which had prescription in their favour, and of which the advantage of ignoring them if they be respectable is not yet certain. A vast and interesting field of inquiry was opened up by the statement of two propositions, which, he believed, were still open to criticism, being neither accepted as certain nor rejected as contrary to fact. One of those propositions was that, other causes being the same, the mortality of a district varied directly as the density of population—a theory which, if admitted to its full extent, placed sanitary science in direct opposition to the tendencies and desires of modern civilization. And here he could not avoid a reference to the facts compiled by Mr. Bayley. It was observed in a late epidemic that in 134 of the more thickly-populated districts—the population being 915 to the square mile—the deaths averaged 65 to 10,000 living. In 404 districts of lower cholera mortality, with 235 inhabitants to the square mile, the deaths averaged 7 in 10,000; while in the remaining 85 districts, with a population of 122 to the square mile, no deaths whatever from cholera took place. He need not remark that the concurrent testimony of all ages and of all countries pointed to the density of population as affecting the rate of mortality; but this general belief could not be accepted as establishing an exact scientific law without further investigation. No satisfactory general principle could be ascertained upon one or two isolated instances; time would be needed before the inquiry could be set at rest. The second proposition might be stated thus—that, other causes being equal, the salubrity of a district would vary directly within certain limits, according to its altitude above the sea. That this had been the case in London he firmly believed. Here, as in the former case, the general sense of mankind was in favour of the principle laid down; but this was a consideration on which, in a matter of this kind, over-much stress must not be laid. When it was remembered that commercial advantages had caused the building of almost every great city in the world on low-lying ground in the vicinity of rivers, they could not but see the importance of this fact, as, if it should be found that density of population and lowness of site were in a marked degree aggravating causes of disease, they could hardly be considered as preventible causes, so far, at least, as the existing generation was concerned. In regard to special occupations, it was well known that the pursuit of many was attended by some peculiar form of malady, the origin of which was distinctly traceable to the nature of the work done. Excessive toil, exposure to sudden changes of temperature, the inhaling of certain vapours—these, and many more, were to be noted as causes of disease arising out of, or in connexion with, special employments. Sometimes these admitted of prevention, and sometimes of modification only. To take an instance familiar to many. The men at work in the deep mines of Cornwall were peculiarly liable to pulmonary complaints, brought on by ascending almost perpendicular ladders, and being exposed to the sudden change of passing from the heated temperature of the pit to the cold air of the surface of the earth. In some mines this had been proportionately diminished, and a prolongation of life obtained by the simple expedient of raising the miners by mechanical appliances—thus reducing the time occupied in ascending from the pit from an hour and a half to half an hour, and economizing the exertions of the men to an extent equivalent to one-third of a day's work. There was also an instance of the saving of life by mechanical means in the case of cotton-mills, where, by boxing off certain portions of the machinery, the escape of the fine particles of cotton, which at one time were drawn into the lungs of those employed, was prevented. Similar precautions had also been taken by the steel-grinders of Sheffield. Much research had of late been employed in investigating the subject of industrial pathology, and it was one to which, with more than common interest, public attention should be turned, since, by the nature of the case, the Legislature could do little or nothing in a remedial way, and, whatever reform was effected, must be by the individual exertion of employers and those employed. It was true that in France and other countries a very

minute code of regulations had been drawn up to reduce, if possible, the risk of persons engaged in hazardous and injurious trades, which code would be found in a treatise by Dr. Lewis, published under the authority of the Board of Health. But a strong feeling existed in England against such interference, which could only be enforced by a vexatious system of supervision and inspection; and he was willing to hope that compulsion would rarely be desirable, even if the temper of the public mind rendered it more possible than it is. At the same time he was bound to express his belief that, though such was the case, hundreds of valuable lives were yearly sacrificed, not so much from the neglect of precautions known to be necessary, as from ignorance, and consequent indifference to the whole matter. Adverting now to the third head of the inquiry into which he had been led, viz.: the remedies applicable to existing sanitary evils, he would frankly acknowledge his inability to do more than glance at a few of the many schemes which had been advanced of late years. In regard to the prevention of overcrowded dwellings, and the enforcing by law of proper sanitary regulations in their construction, the difficulties were practical rather than theoretical—they related not to the question "What shall be done?" but rather to the manner "How to do it?" The principle that no man has a right so to use his private property as to create a public injury; or, in other words, that the fear of pestilence is a sufficient cause for legal interference with even the most private and domestic arrangements of life, is, by law, and by the common sense of mankind, generally recognized. The extent to which this indisputable right shall be enforced must depend upon many considerations which fell rather within the province of the practical statesman than of the sanitarist. It was a common thing to complain of the existing state of the law as giving imperfect authority in this respect. He doubted, however, whether these complaints were borne out by facts, and he believed that whatever short-comings were manifest in our system of sanitary police, were due rather to an imperfect appreciation of its necessity by the public than a want of power on the part of those having authority. It was idle in this country to suppose that any laws, however perfect, would be efficient unless backed by public opinion, and whenever the danger of pestilence was felt to be as fearful a thing as war—when physical injury was as much dreaded as mechanical—then, and not till then, would our preventive remedies be adequate to keep in check the authors of mischief. More stringent legislation, or more stringent enforcement of existing laws, would tend only to call forth one of the feelings which, in most men's minds, were strong—that of jealousy. The regulation of common lodging-houses under the existing law was an exercise of judicious legislation. It was not forgotten by the framers of that Act that to require in such houses accommodation involving much additional expense, would be to exclude, and thus render homeless, the large mass of our poorer citizens. Nothing more, therefore, was attempted than the enforcement of such regulations as would conduce to the ordinary necessities, the decency and health of the inmates; and the results had been most successful. The Act became law in 1851. It had been shown that these houses had become the foci of epidemic disease; and after three years' trial of the working of legislation upon the subject, the report stated that the result, especially as to the reduction of such diseases, was far greater than the most sanguine had anticipated. In 1853 there were in London 30,000 persons accommodated in these houses, among whom only 10 cases of fever were known to have occurred. During the cholera epidemic in 1854 the immunity which they enjoyed from disease was most remarkable. He refrained from quoting the figures which he had by him, and which were taken from the report of the medical inspector of the Board of Health, who, speaking of the sickness and mortality at that time, said that, considering the locality and the character of the inmates, they were very small. The mention of these dwellings led him to speak of the model lodging-houses erected in every great town, and which, for the most part, really answered to their name. He wished he could add that their success was proportioned to their deserts. Those in London were admirable in plan and arrangement; they were generally well occupied, though not crowded, but they met the wants of a class not entirely destitute. In reference to such attempts to provide accommodation for the labouring classes in towns, he had only one remark to make—viz., that if they were to be kept up for any length of time, they must be made to pay their way. It was fair enough that at first they should partake of a charitable character, but it was absurd to suppose that they could be supported entirely on that basis, nor was it indeed, desirable, as it was really upholding pauperism in disguise. The problem was, not how to provide a lodging for the humbler classes at any cost, but how to provide the best lodging which they could afford to pay for, and give, at the same time, the ordinary profit to the owner or builder. What had been done hitherto in this direction must be regarded as a tentative rather than as a successful scheme. The grounds upon which success was looked for by the founders of these lodging-houses were three-fold; first, they reckoned on the far more profitable investment of large capital; secondly, on the more respectable character of the lodgers causing fewer losses of rent; and, thirdly, a saving in ground-rent, where heavy, consequent upon the vertical elevation of these buildings. The only objection which appeared to be raised against these erections was, that they involved a change in the habits of the poor, who had shown a decided antipathy to the Scotch, or continental, mode of living in flats one above another. Of public baths and washhouses, which were among the most efficient means of promoting sanitary reform, he need say nothing, except that the movement for their establishment had been successful, and they appeared to pay their way best where the population is densest—that is to say, where they were most needed. Having touched upon these great measures—the legal repression of nuisances and the improvement of the dwellings of the poor—he came now to that question upon which, of late years, so much had been said and so little done, and here, perhaps, he might offer a word of consolation to those who lamented the slow progress made. It was better, of two evils, to do little right, than to do much which would have to be undone. In the able report of Mr. Austin, published this year, would be found the results of various experiments tried in a general way in reference to sewerage. Of these experiments it might, perhaps, be said that, though several appeared promising, none of them had so far succeeded as to justify their general adoption. One thing was clear, and that was, that neither the law, nor private convenience, nor public health would allow of the continuing to poison the rivers and brooks of our country in the manner which had now become common in large or moderate-sized towns, where a complete system of drainage was established. Deodorization by some means had become a necessity. If it could be combined with agricultural advantage so much the better, but, whether the process could be made to pay or not, every local board of health or other governing body ought to be bound as much to purify its sewerage as to remove it. No person and no community had the right to transfer a nuisance from his or its own door to the door of a neighbour. It was possible in every case, by the payment of no large sum of money, to secure the accomplishment of the work in question by private speculators. If this were so, and the experiments now carried on were tolerably successful, we should probably be able to do something better with our metropolitan drainage than carrying it at the cost of many millions into the sea. One subject connected with public health had been brought prominently under the notice of the Legislature—he meant the frequency of deaths by poison, and the expediency of restricting the sale of such articles. No law, however, that Parliament could frame would do more than palliate this evil. Many deaths by poison were suicides, and suicide was a non-preventible evil. There was a difficulty, too, in restraining the purchase of poisonous articles, arising out of the fact that such articles were much in use for innocent purposes. But, when it was found that 540 deaths took place by poison yearly, on an average of six years, and that of such deaths three-fourths were by two poisons, arsenic and opium, whilst a list of 13 other articles included every other case, the difficulty was rendered less apparent. On this point, however, he quoted the evidence of Dr. Taylor before the House of Lords, to the effect that, "great as undoubtedly was the nuisance, and even danger, to the public of the present system, we should be introducing a remedy worse than the disease, if, as some sanitarists propose, the Government should look after the public supply in every department. He doubted whether, after all, it would be effective, and he was sure that private means should be tried first. He always held that, in sanitary and in all other departments, governmental interference should only be resorted to in cases of proved necessity, and where it could be shown that the end proposed—the security of the public health—could not be attained in any other way." In sanitary matters, however, as in some others, theory must often give place to practical proof; and he would proceed to notice a case in which legislative interference had been acted upon with advantage—he referred to the prevention of small pox by the Public Vaccination Act of 1841, and the Act of 1853, which made vaccination compulsory. It was known to most present that these Acts had caused a violent outcry on the part of certain persons, who objected on medical grounds to the enforcement of a practice which they considered injurious and dangerous. A vast mass of evidence, English and foreign, had, however, been collected by Dr. Simon, which proved that the objection was unfounded; and the most conclusive evidence of the salutary character of the legislation was presented in the fact that, since 1841, the deaths by small pox had diminished to one-half. It was further proved that, of those who died from the disease in question, 75 per cent., or three-fourths, were children under five years of age. Complaints were made that the machinery of the Act was defective, that it could not be enforced, and that the remuneration of those who had to administer it was inadequate; but the sanitary police of towns was now so well understood that to dwell upon these points was needless. He had passed over one cause of disease, that of intramural burials; because in this, as in similar cases, the remedy was simple, and no question could arise except as to what authority the execution of the public will should be entrusted to. The management of hospitals, and the supply of medical aid and advice to the poorer classes, constituted an important element of sanitary consideration. The former, in this country, were, however, supported by the public, and not by the State; although the principle of State aid in medical matters was recognized, both by the appointment of public vaccinators since 1841, and by the distribution of medical relief in many forms—the Irish Dispensary being a case in point; yet the tendency of the Legislature had always been to confound medical relief with the ordinary relief of pauperism, and to deal it out through the agency of the poor-law board. The degree to which, and the conditions on which, such relief should be given, had been the subject of parliamentary debate. It was argued on the one hand, that medical aid should be granted only on the plea of destitution, it being assumed that every independent person was bound to provide it for himself. It was contended on the other hand, that, as disease once established had a tendency to propagate itself, the public had an interest in the well-doing of every individual. Those who took the latter view further believed that it was a check upon pauperism instead of an encouragement of it, since the pecuniary position of the working man depended upon the state of his health; and that, while there might be abuses arising out of the distribution of public food, there could be none with respect to medicine. He did not undertake to decide the point, but there were two objections to State interference in this matter which had great weight in his mind. One of these objections was the natural and inevitable tendency of the public to regard it as eleemosynary in its character, which would be fatal to any scheme of the sort; and the second was the great diversity of feeling respecting medical science, which made it difficult for the State to ally itself with either party. He feared no contradiction when he affirmed that no class of educated men were more hardly worked, or worse remunerated, than medical men who devoted themselves to the public service. Their claims and grievances deserved more notice than they had yet received; and, though the power of the officers of the Board of Health was matter of dispute, he did not hesitate to say that a person charged with the duty of making known any gross invasion of sanitary laws, ought to exist in every town, and to be adequately remunerated. He regretted the length to which these remarks had extended, and still more did he lament that, having to touch upon so many topics, he had been unable, in the very limited time at his disposal, to do justice to any one of them. To those whom he had been addressing himself he would now say, only take with you this last word: dry and unattractive as sanitary studies may appear, they concern the patriot no less than the philosopher. They touch very nearly the future prosperity and the national greatness of England. The effect of disease upon a community was very inadequately measured by the number of deaths that ensued, as in a battle the killed bore but a small proportion to the wounded. It was not by the crowded churchyards, by the frequent funerals, by the destitution of families, or by the increase of public burdens, that you could test the sufferings of a nation over which sickness has passed. The real lasting injury lies in the deterioration of race—in the seeds of disease transmitted to future generations—in the physical degeneration and decay, which were seldom perceived until the evil was past cure, and of which even then the cause remained often unrecognized. If the mission of England was, as he believed it to be, that of colonization and dominion abroad; if wild herds and savage races were to be brought by our agency under the influence of civilized men; if we were to maintain peace, to extend commerce, to hold our own among many rivals alike in arts and arms, it concerned us that strong hands should be forthcoming to wield either sword or spade; that vigorous constitutions be not wanting to endure the inclemencies of all climates and the hardship of settlers in new countries. He believed that, whatever individual exceptions might be found, when we came to deal with men in the mass, physical and moral decay were inseparable; and it would be small satisfaction to know that through a series of ages we had successfully resisted every external aggression, if we learned too late that that physical vigour and energy by which ours was confessedly pre-eminently distinguished above every other race in the world were being

undermined by a secret and irresistible agency, the offspring of our own selfish neglect, against which both science and humanity had warned us in vain. (The noble lord resumed his seat amidst loud cheers.)

WEDNESDAY, OCT. 14.

The Public Health Section met this day in the Queen's College—Lord STANLEY presiding.

Mr. W. H. MICHAEL read a paper on

THE INFLUENCE OF HABITATION ON THE COMMUNITY.

The first part of this paper was devoted to a general description of the class of small houses in which the poor are found in densely-populated cities and towns, and the rapidly-augmenting evils resulting from overcrowding. In a sanitary survey of the town of Swansea, the writer had ascertained the alarming extent to which these evils existed; and he presented some statistics to show how great had been the consequent mortality, especially during the cholera epidemic. The question which first presented itself for consideration was—What could be done to check the onward flow of this tide of disease and crime? The Public Health Act was inefficient, even where it was in exercise. It might prevent new buildings of the same character; it was powerless with the old. It dealt with the apparent; it was too often afraid to touch the real; and it never could do its work efficiently for the public until the interior as well as the exterior of houses were somewhat under the control of efficient medical officers, whose duty it should be to prevent, not to cure disease. The truism that "Every Englishman's house is his castle," might serve well to turn a period; but owners of property must be taught that no property could be held for private gain at the cost of a preat public wrong. This, however, and a great many other truths, the public were not prepared to receive. Sanitary reformers were looked upon by the great mass of the people as amiable enthusiasts; and if their theories were put into practice, it was in spite of the most relentless persecution. The public did not believe in the evils alleged, and therefore could with difficulty be persuaded to cooperate for their removal. Many years, it was to be feared, would be required to persuade them that sanitary improvements were the greatest boon it was in the power of the authorities to bestow; but, until this public opinion was created, legislation would prove, to a great extent, inoperative. But should it become general only to allow two-thirds of property to be built upon, to afford proper and well-regulated inspection of houses, and generally to afford efficient relief in the way of ventilation, drainage, and water supply, it would be a noble result of the labour bestowed in this cause.

Mr. E. CHADWICK said a number of facts, showing what might be done under the Public Health Act by way of remedying the evils referred to in the paper just read, were set forth in a paper prepared by Mr. May, of Macclesfield, which it would be well, perhaps, if that gentleman would give them an outline of.

Mr. MAY said he could not undertake to narrate those facts with accuracy unless he were permitted to read his paper.

The CHAIRMAN thought it would be better to confine their attention to the paper of Mr. Michael at present.

Mr. CHADWICK said the document he alluded to showed what had bee done at Macclesfield under the Act he had referred to, and in circumstances precisely similar to those which existed at Swansea.

Dr. SOUTHWOOD SMITH bore testimony to the facts set forth by Mr Michael as to the degrading influence of overcrowding. More than 20 years ago, when he was a physician in the eastern part of London, he had been eye-witness to evils as revolting as those which had been disclosed in connexion with the town of Swansea.

Mr. CHADWICK related an instance of a similar block of buildings to those spoken of by Mr. Michael which existed in the parish of Lambeth, and where, at one time, the mortality was as high as 40, and had even reached 50, per 1000. By drainage alone, without any material alteration as respected ventilation, or any change in the condition of the inhabitants, who were working men, the mortality was brought down to about 13 per 1000. One result, however, of the diminution of sickness and death in the locality was that many of the houses which had been empty became tenanted, and, indeed, overcrowded; and the mortality again increased to 20, and even more, per 1000. The first fact showed what might be done by drainage; the second, what was the consequence of overcrowding.

Mr. MAUNDER urged upon the society the consideration of the propriety of establishing lectures, addressed to the wives of the working classes, upon the importance of sanitary precautions, especially in reference to efficient ventilation of dwelling-houses. The close and stifling atmosphere pervading the homes of the poor had often been forced upon his attention, and he was convinced that very imperfect ideas of cleanliness and ventilation, as bearing upon their physical health and well-being, prevailed amongst them. By means of lectures such as he contemplated, the subject might be familiarized and illustrated, and, if that were the case, there would be a demand for a better class of cottages, which would soon meet with an adequate supply. While the poor remained in ignorance of what was so essential to their good, the difficulty of removing the evils which sanitary investigation pointed out was very greatly enhanced.

Mr. P. H. HOLLAND, medical inspector, said that, though the general state of the public health was to a large extent attributable to defective arrangements as regarded habitations, no one must run away with the notion that this was the sole cause. The persons who resided in these crowded houses were the very poor, which was both the cause and the effect of their wretchedness. If all houses were under inspection, and none were allowed to be inhabited which were too small for healthy existence, the effect would be that the miserable abodes referred to would no longer remain, as at present, a profitable investment. The increase of rent to the inhabitants of a better class of houses would be more apparent and real, as, in the defective dwellings they now hired, a large part of the nominal rent was never received. The great losses which the landlords of such property sustained arose from the bad health of their tenants, and the consequent expenses thus entailed, which caused their rents to be frequently hopelessly in arrear. It was a great social error to allow our countrymen to occupy such abodes as they did, exposed to influences which were so prejudicial to health and life. The loss of every one of their lives was a loss to the country: the death of a father entailing a burthen upon the public in the support of his children, the death of a child representing the loss of capital expended upon its maintenance and training up to the age of its death, and the death of a wife often proving the entire ruin of the family. If all the pecuniary loss thus sustained were added together, it would far exceed in amount the extra expenses which providing better accommodation for the humbler classes would involve. In every point of view it was the worst possible economy to allow houses to be built which were unfit for occupation.

Mr. TRIPE, of Hackney, hoped that this question of overcrowding would be fully discussed during the sittings of the association, as it was an evil which was most pressing, and one of the most difficult which medical officers of health had to deal with. At the same time, they must be careful not to attribute to overcrowding that which arose from a variety of causes. They must proceed upon some definite principle in dealing with this matter, in order that some definite remedial measure might be adopted. It was quite clear that houses for the poor must be provided, as in many cases their houses were being pulled down to make way for improvements in towns: the consequence was, that as artisans and labourers must live near their work, they were crowded into the comparatively few abodes which remained, and evils were produced such as those referred to in the paper just read. How was this to be avoided? That was the question. It was quite clear that the rich would not build houses suitable for the poor in towns. Were their homes to be removed to the outskirts? If so, there must be railway accommodation provided to bring them easily and cheaply to and from their daily labour.

The CHAIRMAN said: With regard to a statement made in the paper read by Mr. Michael he would make one or two remarks. He heard one statement in that paper, which he confessed he should like some further confirmation of before he received it as certain, viz., that this most obnoxious class of houses, built in defiance of all sanitary regulations, was the class that paid best. No doubt the rents received were very high, and no doubt the immediate profit to the owners appeared considerable, but he imagined that from this apparent profit large deductions must be made. Of course, in calculating what should be the return upon a building, the length of time for which that building was likely to last must be taken into account. Clearly, therefore, a building badly and hastily run up, though producing at the present a large rental, could not be regarded as yielding so much actual profit upon the outlay. He believed that the per centage of loss by sickness and death of tenants, and the consequent inability to pay rent, was in many of such cases enormous. In the interesting calculations they had heard, he thought the comparisons were a little more unfavourable than they ought to be, because the high rates of mortality which were taken were, compared with the nominal amounts, assumed to be 16 per 1000. No doubt there were some localities in which the rate was as low as 14; but, taking the whole country through, he thought 16 was rather lower than they had any right to reckon upon as an average. Something had been said with regard to the way in which the law ought to be enforced in reference to the overcrowding of houses. One great difficulty in the way of enforcing it was the utter indifference of the poorer classes, as a rule, to the subject of ventilation, and to the value of pure air. He believed that any one who had gone much into the cottages of the poor, whether in town or country, must have been much struck with the fact; and, so long as this indifference lasted, there was an obstacle in the way of sanitary progress which it was impossible to over-estimate. He would also offer one word of caution. He thought that, although a great coincidence might be shown between the worst class of houses and the highest rates of mortality, and though, no doubt, the imperfect sanitary arrangement of such buildings was one cause of that high death rate, they had no right to assume that it was the only one. In making any calculation upon the subject, they must take into consideration the habits of the inmates as well as the character of their houses. He had recently met with a most painful statement of fact, viz., that the wards of our London hospitals were at no time free from cases of disease which were produced by actual starvation—i. e., by an insufficient supply of food, continued for a long time, undermining the constitution, and rendering it utterly unable to resist the attack of even ordinary maladies. These and kindred circumstances must be taken into account whenever a contrast was attempted to be drawn between the rates of mortality among the rich and the poor, and the difference in excess with the latter must not be wholly ascribed to the different class of houses in which they were compelled to reside.

Dr. SIMON said, in the case referred to by Mr. Michael, no doubt there were other influences at work; besides the filthiness of the people, there was no doubt that their poverty contributed to bring about the result. And let him be allowed to say, in passing, that if it were poverty, not the less ought it to be inquired into, for he believed the common sense and Christianity of this country would go with him when he asserted that it was an atrocious thing for people to die of poverty amongst us, whether by poverty directly or indirectly. He would just give one illustration of the influence of sanitary regulations in affecting the rate of mortality. The case was that of a London hospital appropriated to the reception of lying-in women. During ten years the mortality among the women admitted to this hospital was a mortality of pretty nearly 60 per 1000. A year intervened, and in that year something was done; and then for six or seven years afterwards the deaths, instead of being something like 60, were only at the rate of 4½ per 1000. Of course in a matter of this sort there might be a little source of fallacy, as in the numbers compared at the same period there might have been a little more of the mortality which arose among puerperal woman, from accidental causes, and from hœmorrage; but, in the main, the deaths represented the mortality arising from puerperal fever. What determined the difference? He would give no opinion, but simply give a statement of what occurred in the year intervening, There were two things done: there was an obstruction of the drainage cured, and an improved system of ventilation introduced. Having had all the facts before him, he could speak confidently as to their accuracy, and without offering any opinion as to how much each of the remedial measures adopted contributed to bring about the result, he thought the case, as an instance of an incomplete experiment, offered an illustration of some of the principles alluded to by Mr. Michael, because here were patients admitted into the same institution, under the same circumstances, and treated by the same medical officers, and yet presenting so great a difference in the rate of mortality.

Mr. MICHAEL, in replying to the observations made, said it was evident from the title of his paper, that he only intended to indicate the overcrowding of dwellings as one of the sources of the evils referred to. In the next place he observed, that he did not take 16 as the basis of the death rate, because he knew that that was open to remark as involving a fallacy; but he took 24 per thousand, which was the rate belonging to the district in which these evils existed. In some parts of that district the rate had risen as high as 45; it therefore followed, that in others, 16 more than represented the actual state of things. He impressed upon the section, that to a very large extent the quality of human habitations determined the character of a population. The discomforts and miseries which a man endured in his home often drove him into scenes of excitement and dissipation, where he lost both money and moral character.

Mr. C. H. BRACEBRIDGE said the fact must be borne in mind, that it was not only the poor but the rich, and those who should be well informed, who were ignorant on this question of ventilation. It stood in evidence, and Mr. Chadwick knew the fact, that a sergeant of the guards, in giving evidence lately, stated that the dormitories at the Wellington Barracks were in as bad a state as they could be. Efficient ventilation of a small

house rendered it almost equivalent, in a sanitary point of view, to a larger habitation.

HOUSES FOR THE POOR.

The Rev. C. HARTSHORNE read a paper on this subject. There was nothing, he said, which so much required attention as the dwellings of the humbler classes of society. It would not, however, have escaped notice that the question of the erection of labourers' cottages had already engaged the consideration of several wealthy landed proprietors; while, on the other hand, many individuals engaged in manufacturing businesses, were desirous of erecting homes for their workmen and dependants on a good system, if they knew how to do it at a moderate cost. The matter of economy, combined with the provision of suitable arrangements for the health of the inhabitants, was, of course, the great desideratum sought. The drainage of such habitations should be connected with the houses themselves, and should pass entirely round but not under them. This was essential alike for the preservation of the walls and the health of the inhabitants. A dry floor was of the utmost consequence for health as well as cleanliness. It should be laid with bricks, quarries, or flags, upon a prepared or concrete foundation, so that all moisture might speedily escape. After referring to the mortality returns for Bedford and Essex, which showed that the majority of deaths from scarletina and other zymotic diseases occurred in the most densely-populated districts, the paper proceeded to point out what were the chief points to be kept in view in providing suitable dwellings for the poor. In erecting new cottages, the fact should not be lost sight of that a sunny aspect gave cheerfulness to the abode and inspired a feeling of that sort in the inhabitants, while the reduced duty on glass windows allowed of their introduction with freedom. A plentiful supply of good water should be secured; and if cottages were constructed as they ought to be, a provision would be made so ample that they would never be without it. Efficient ventilation was absolutely necessary, and sufficient sleeping accommodation, to ensure the preservation, not only of the health, but also of the modesty and decency of the inmates. Very much had been done in the way of improvement in this respect during the last few years. The subject had been taken up in influential quarters, and Prince Albert had actively exerted himself to overcome the difficulties by which the question was surrounded, and had set a noble example which it would be well for landed proprietors to emulate. The 20 well planned cottages built by His Royal Highness in the Windsor Great Park were, however, too costly in their construction for general adoption. Since 1851, Mr. Gore had caused upwards of 100 new cottages for labourers to be erected on lands belonging to the Crown. The Duke of Northumberland had done very much in this way, and all his cottages were so constructed as to be most likely to meet the wants of his dependants: they were commonly built of stone, well drained, well ventilated, and perfectly dry, and the living-rooms in many were as much as 16 feet long by 14 feet 6 inches wide. His Grace possessed 1379 such cottages; he had repaired 250 at a cost of £55 each, and erected 210 new ones at a cost of £210 each. Altogether, he had expended £52,700 in the erection and repair of cottages. These habitations, together with half an acre of land attached, he let at the rate of 1s. per week. In a similar spirit, Earl Spencer had erected 87 new cottages at a cost of £15,220, or £190 each; this, with repairs effected in 140 others, had involved an outlay of £18,000. The extraordinary exertions of the Duke of Bedford were next referred to. His Grace had erected in Bedfordshire 282 cottages; in Devon and Cornwall, 190; in Cambridge and Northampton, 72; and, in Dorsetshire, 22; making a total of new cottages built within the last nine years of 566. The cost of these in counties where stone was at hand was £100 each; in the midland district, £120 each; and the entire expenditure was £62,690, besides the large expenses incurred for repairs. In all, the drainage, water supply, and ventilation were good, and the inmates were prohibited taking lodgers. The rents were—for two-bed-room cottages, 1s. 2d., and three-bed-room cottages, 1s. 6d. per week each, possessing 16 poles of garden ground in the rear. The sewerage was so arranged that all the house-refuse was readily available for garden purposes. The Duke of Northumberland's cottages were substantial and warm, and of pleasing architectural appearance; the Duke of Bedford's were mostly built of brick, and, therefore, of less architectural pretension, but equally as well suited to the purpose, with a due regard to economy. They were really good labourers' cottages, and greatly tended to the well-being of those who were fortunate enough to live in them.

Mr. A. HELPS said he was sure that, from the essentially practical character of their noble president and those by whom he was surrounded, he should meet with general acquiescence when he said that what they had to consider was not so much the present state of affairs—with which, alas! they were all too well acquainted—as what remedy they could apply to it. Now there were three things which greatly opposed the progress of sanitary reform. The first was our dire familiarity with things close to and about us, which seemed to require a continuous stream of talent, so to speak, directed upon them to awaken and fix our attention; next, the tremendous ignorance generally prevailing on this subject; and, thirdly, the peculiar ignorance of members of Parliament. He had noticed, with the greatest possible pain, that whenever measures had been brought forward, prepared with great care, and after long study, some person—probably a metropolitan member—steeped in ignorance to the lips, made some foolish objections—perhaps called the Minister Jack Cade—and caused the loss of the measure. One practical suggestion he had to make: he was excessively anxious to bring before the public, in some way which they could not ignore, the effects of a vitiated atmosphere. Was it not possible for scientific men to invent an instrument which should show the vitiation of the air? It was very difficult indeed to persuade men of the dangers that existed all around them. He felt convinced that, if scientific men would give their minds to it, they could invent an instrument which might be, say stuck up in some of the theatres, to mark this in a way which would impress itself forcibly upon the popular mind—as, for example, that in the Princess's it stood at 30, in the Lyceum at 25, and so on—a great good would, we believe, be attained. He would leave Greek scholars to invent a name for such an instrument—perhaps the stenchometer would do. People would soon believe in it; and even members of Parliament, with such an appeal to their senses, might perhaps be won over to believe in the existence of the evil which they were now considering.

Mr. CHADWICK said it would be exceedingly desirable if at some future time Mr. Hartshorne could ascertain, and lay before the association, the particulars of the amount of sickness and mortality in these cottages, as compared with other places in the same district.

Mr. BRACEBRIDGE: And also the amount received per annum for other places as compared with these.

In the absence of Dr. WYLD, who was to have read a paper on the "Ventilation of Buildings,"

Mr. RUMSAY read the first part of a paper, prepared by himself, on the deficiency of sanitary legislation, entitled,

DENSITY OF POPULATION AND LOCALIZATION OF DWELLINGS.

The modern art of Hygiene, he remarked, has arisen out of the aggregation of mankind in cities and towns. The necessities, the ignorance, the unconscious improvidence of many generations in this process of aggregation have bequeathed to us the Herculean task which sanitary science alone can enable us to fulfil. But we apply our sanitary measures to towns as they stand. No statesman, no Parliament, has ventured to grapple with the question of the localization of communities. Viewed in this light, therefore, our sanitary art is simply remedial, not preventive. True, it is a remedy of the first order, *i.e.*, it remedies a cause instead of an effect. But, as in all other remedial arts, its measures are pallintive and curative. For what are our complex plans of ventilation, our costly systems of sewerage, our vast water reservoirs and aqueducts, but palliations of a permanent mischief. Let all these remedies be in full operation, the air breathed in overcrowded cities still remains charged with sources of disease. Can nothing be done, then, to remove the density of town population? The area of the London division of the English population allowed, in 1851, on the average, thirty persons to the acre; or 160 square yards to each of its 2,362,000 inhabitants. But this average gives but little idea of the real crowding of particular districts. In the East London Union 290 persons are pressed into an acre, allowing only about one-tenth of the average metropolitan space; and even grouping the four central districts—East and West, the Strand, and St. Luke's—the average is only 19 square yards to each. In central Liverpool the average is 100 to an acre, or 48 square yards to each person; but in Exchange Ward, containing nearly 13,000 inhabitants, there was only a ratio of less than 9 square yards to each person, and in one part of the same ward, containing 8000 inhabitants, the average for each was only 6¾ square yards. In one street with 1490 inhabitants, the area was only 4 square yards to each. In Nottingham, in five specified districts, the number of square yards to each person were 11½, 10½, 9½, 8½, and 7½. In Paris the area allowed to each inhabitant is from 14½ to 17 square yards, or less than the space allowed in the more crowded London districts. In 1832, the population had accumulated to such a degree, that in some quarters 1500 persons were located upon 1 *hectare*, allowing only about 8 square yards for each person. Well might the Parisian cholera commission remark, "One would hardly dare to plant 1000 trees on the same space if one wished to preserve their health." It is true that improvements have been made, that large blocks of buildings have been pulled down, vile houses swept away, and nondescript hangers-on of the lowest class of inhabitants have been forcibly dislodged; but no adequate accommodation in more improvable localities has been made. Large model buildings have indeed been erected here and there, either by private benevolence or by associations for improving the dwellings of the labouring classes. Great care has been taken in the scientific construction of these buildings; ventilation and a comparatively good cubic space in the rooms have been secured, and the success of the experiments in London, we are told, is proved by an annual death-role of 16 per 1000. But I do not accept this as a fair test of the success of a scheme which has been so recently adopted. The first inhabitants of the model lodgings would belong to a better-conditioned order of working men. Their selection of such dwellings would indicate the possession of a higher taste, greater frugality and temperance, and more adequate means of livelihood than the average of their class. Besides, the death ratio of any small population is, and always must be, a fallacious test of its healthiness. The occupants of model buildings of this sort in the heart of a crowded city must not only breathe the contaminated atmosphere of the district, but as the gaseous products of exhalation arose through the many stories of these lofty blocks, we know that the inhabitants, especially those of the uppermost stories, must be exposed even under the best system of ventilation to additional risk and foul air. The very currents of air have been poisoned before they are circulated. There must be a defective vital force—a low standard of health arising from defective æration of the blood in these as in all other crowded communities. The metropolitan association buildings only allow 4½ square yards to each inhabitant. For all these reasons we shall do wisely to wait until the experiment has been longer tried, and its elements better sifted, before we can pronounce upon its sanitary success. The social aspect of the well-meant expedient is not encouraging. One of the best and noblest features of English life is its domesticity. An English family is an isolation of hopes and fears, joys and sorrows, with which no stranger can meddle. The cœnobitical life of the continent is incompatible with that wholesome social reserve which lies at the foundation of our national greatness. It is difficult to conceive how large communities of families in single houses can long maintain that separate domestic existence which seems essential to the maintenance of the national character, and which renders absolute freedom of speech and action in this country so safe to the Government, while in other European states it is found to be so dangerous. In our parsimonious use of land we have omitted a most important sanitary regulation, viz., the separation of houses. It was a law of the twelve tables, one in force during the best days of Rome, that no two houses, whether the *domus* of the nobility or the *insula* of the common people, should touch. A space of not less than five feet was to be left between them. But we are not contented with uninterrupted lines of houses, for two parallel lines of the worst class of dwellings are often in actual contact, and seldom was there allowed more than the narrowest and darkest insterstice for back yards between them. Herein is shown the urgent necessity for building laws of a more reformatory character. The various changes now taking place in the localization of the masses mainly upon the rapid increase of these town populations from rural immigration, and the mushroom growth of an inferior kind of dwellings in neglected suburban districts. For, externally to our limited sanitary jurisdictions, the belts of border land beyond the reach of municipal rate, defying the interference of rural magistrates and guardians, and there are tempting fields for the wild speculation of unscrupulous builders. How are we to deal with these outlying districts, which admit of improvement, and prepare them for the occupation of those who require removal from the centres of dense population? They should be included with the rest of the country in sanitary jurisdiction, and more extensive power entrusted to the superintendents of these districts. To abandon these wanderers, hanging on the skirts of civic regulation, to the speculation of harpies who pray on them, or to leave them to their own inadequate resources, would be a national blunder of criminal magnitude, and would entail its own punishment. A great social crisis may meantime occur, and the persons who now cry out against State interference would be the first to denounce Government for its supineness, and advocate arbitrary and desperate measures. Sound political economy would, I believe, justify national intervention in this state of things. The legislative provisions which are in force for aiding agricultural drainage might be applied to the advance of capital necessary for the erection of well-ordered suburban

villages. No expulsive process should be permitted in towns until the State or the capitalist, under legal sanction, shall have supplied proper accommodation for the homeless thousands. A general demand for superior accommodation will not arise among the working classes until they witness the happy experience of those who have been benefited by a better supply. Even if large national advances were required for the inauguration of such a reform, would a people which unhesitatingly sacrificed £20,000,000 in one vote merely to shorten the duration of a colonial slavery certain of extinction—a people which no less willingly spent £80,000,000 in two years to protect a distant ally and to adjust a hypothetical balance of power in Europe—would such a people refuse a bold outlay to effect a thorough social reform at home—a reform which must incalculably increase the happiness, security, and wealth of the whole community? He could not bring himself to believe this. All that was wanted was the directive mind. Instead of expending million upon million in rendering densely-peopled districts more safely habitable, let the dispersion of the compressed masses be cautiously and gradually promoted. Let open and elevated spots, of good soil, climate, and water supply, be selected for occupation. Let wide streets of detached double cottages, not more than two floors in height, be built on these sites, so as to afford, on the average, 60 square yards of surface to each inhabitant. And, to complete the project, let railway transit be provided (on fresh lines, if necessary, and of a simpler and far less expensive kind than that now afforded) for the conveyance of working people to and from the commercial dépôts or manufacturing establishments where they might be employed. Under recently-discovered economical processes, without reckoning on future improvements of this sort, the total cost of railway conveyance need not equal the difference between the rent of a rural cottage and a set of rooms in some confined city dwelling. Then would the City workman possess his little plot of garden—the charm of the English cottage—while his own vegetable produce would both economize and improve the diet of his family. A village of this sort would not long remain the abode of only the working classes. Others in easy circumstances would join the community, and the minister of religion and education would there find a people no longer inaccessible to Christian teaching and intellectual culture, and the minister of health no longer turn in dismay from his almost hopeless task of sanitary inspection. Such a proposition would supply but few inmates for the workhouse, the penitentiary, or prison, and the diminished cost of crime and pauperism be followed by diminished local taxation.

Mr. Slaney, M.P., congratulated the meeting on the practical character of the suggestions put forth in Mr. Rumsay's paper. As to the influence of closeness of habitation upon the health, the comfort, the decencies, and the moral feelings of the people, he might say that he had visited many towns, and had seen evidences of the evil state of most of them as regards the dwellings of the people, and he was sure that the health, strength, comfort, and happiness of the nation are influenced directly by the state of the dwellings of the people. Looking at the subject even in the low point of economy, it would pay better to keep the people healthy. The tax-gatherer, the philanthropist, would all feel the benefit. The question then came, how was this reform to be forwarded? With respect to the ignorance of the public, of which something had been said, he was compelled to admit that, with regard to many, the charge was too true; but each day a large number became more and more open to suggestions, and aware of the importance of the question. With regard to the mode of action, he would offer one remark. It had been said at an earlier part of the sitting that, amongst those who were most ignorant of what was required to be done to meet the difficulties of these cases, were to be reckoned those of whom he (Mr. Slaney) happened to be one—viz., members of Parliament. Now he agreed, in many instances, that such was too truly the fact, but he could comfort the honourable gentleman who made the remark, that our legislators also were every day becoming more and more open to conviction on the subject, and more willing to listen to any practical suggestion upon it. He augured much good from the establishment of this society, in spreading a knowledge of that which it was the duty as well as the interest of even such hard-hearted and densely-minded men as members of Parliament to aid in carrying out. While he had listened with pleasure to the proposals for improving suburban districts and providing in them comfortable homes for the working classes, he could not but feel that there were several statements contained in the inaugural address of their noble chairman (Lord Stanley) which would tend to check, as it was indeed desirable, the enthusiasm of those who would interfere too much by legislative enactment. But now came the question, which was, not so much what they wished to do as what was possible to be done. He felt confident that if by legislative enactment they attempted to meddle too much with the construction of houses, and the mode in which men should lay out their own property, they would have such objections raised as would effectually prevent them doing what it would really be beneficial to do. They had, however, a right to do one thing: they might insist on it that no man shall so act with regard to his property as to injure the health of his neighbours. They had a right to ask for a general building act which should apply to all towns. They had already, in the case of Liverpool, prevented the use of cellar-dwelling, and had found the benefit of so acting; and this benefit should be carried out generally. Extending this principle, we might forbid the erection of houses back to back, by which the free action of air is prevented. But there was also another matter in which there might advantageously be a restriction, viz., upon the construction—very prevalent in Birmingham and other large towns—of building houses in narrow and crowded courts, to which the only entrance was by means of a low-arched gateway, and which were almost impervious to air. There were in Birmingham upwards of 2000 such courts, containing a population of 50,000 persons. It ought to be made incumbent upon the builders of all narrow courts in future, that such means of access should be provided as would ensure a free circulation of air. These were amongst the things which called for legislative enactment; and he felt assured that, when the facts laid before this society should be published to the world, there would be strength enough infused into the House of Commons to enable them to pass such a measure of sanitary reform.

Dr. Begg, of Edinburgh, hoped that in any legislative measures that might be adopted, there would be power taken to render such sanitary precautions applicable, under similar circumstances, to the three kingdoms. He was certain that in Scotland, for example, they had the same evils as those already referred to in far more giant forms. Even in Edinburgh itself, not only had nothing been done in the way of making openings for thorough ventilation, but the openings heretofore existing were being closed up to a large extent. Any person who was at all conversant with that city, was aware that there, places were used for human habitation more degrading than could possibly be imagined by a stranger—worse, indeed, he believed, than the homes of the savages of America. He had himself been in the wigwams of the Indians, and he could truly say that he had seen nothing there to be compared with them. Further than this, he would say that, so far as he had been able to discover, the condition of the rural population of Scotland was altogether peculiar. With more advanced agriculture than exists in England, and with much higher rents than are here secured, they had a far more degraded peasantry. In the centre of Mid-Lothian, where the rents averaged upwards of £5 per acre, there was not, when he first became minister of a parish there, a single cottage containing more than one apartment, or if more, it was the rare exception. In that single apartment would often be huddled together the living and the dead, the sick and the well. That state of things, though partially remedied, was by no means wholly cured. The land for the most part belonged to large proprietors, who were not disposed to do anything to ameliorate the condition of the poor; and the farmers exhibited far more concern for the well-being of their horses and cattle than for the health and comfort of their ploughmen and servants. They knew that if the former died, they must go to market and buy a fresh stock; but if only the latter, they could get a fresh supply for nothing. Further North, matters were still worse; the only residence for the agricultural labourers was the clay hut or boothie, in which often seven or eight were forced to dwell through both summer and winter, while their employers provided splendid stabling and other accommodation for their horses and cows. This was a state of things which prevailed through whole counties, and it was extremely difficult to remedy, unless, indeed, it could be laid down as a principle, that persons who owned large tracts of country should be compelled to provide for the health and comfort of their own people. Things had advanced to such a state in Scotland that, whereas at one time fresh moral health was poured into the cities from the rural districts, the cities were now more corrupted by the contact. He hoped, therefore, that whatever was done by this association—whose formation he hailed as the beginning of brighter days for Britain — the principle would be fully recognized that sanitary legislation should be made to extend equally to all parts of the kingdom. At present, those enactments which had been found to work so beneficially in England did not extend across the Tweed; so that the two countries were united only in name, not in reality. Wherever it was possible, he believed the most effectual way of remedying many of the evils existing in the dwellings of the working classes was to encourage them to do it themselves; and, as one means towards that, he should like extremely to see the introduction into Scotland of the freehold land scheme which had worked so beneficially here.

The Mayor of Hull (Mr. Moss) said it was very desirable that means should be provided for removing the obstacles which municipal bodies often interposed in the way of carrying out sanitary improvements. After referring to the state of affairs in the borough of Hull before the establishment of the Local Board of Health, which was composed of the town council, he stated that, although a survey of the district had proved the fact that, wherever the drainage was the most defective, there the cholera had made the greatest ravages, yet not a single step had been taken by the authorities to remedy that defect. He hoped that, in any amendment of the law on the subject, due regard would be had to this point—that the execution of sanitary regulations should be entrusted to other and more independent hands than those of a town council; or that there should be established some supervision which should be able to compel the local boards to take action whenever a state of circumstances was disclosed proving that such action was essential. He had felt it his duty, as a member of the corporation of Hull, to bring under the consideration of the General Board of Health the short-comings of the local board, but he was informed that they had no power to compel them to take any steps to remedy the evils complained of; and that the only course open to him was to apply to the Court of Queen's Bench for a mandamus to enforce the execution of those duties which were entrusted to them. He believed that the Public Health Act had been so approved by the public, that there would be a willingness on their part to see a superintending power given to some central board, to ensure the carrying out of its provisions.

Mr. Cowper, M.P., said the question had been raised by Mr. Rumsay's paper, who are to administer the law respecting sanitary matters? No doubt the experience of many parts of the country would amply justify the remarks made by the Mayor of Hull, viz., that laws may be very good in themselves, but when the working of them was left to the spontaneous action of local authorities they were very often badly administered, or altogether held in abeyance. Mr. Rumsay had sketched out what he believed would be the remedy for that state of things, viz., to place sanitary administration upon a peculiar footing—altogether different from other matters, which were left to the free representative government of persons residing together in given districts. He (Mr. Cowper) thought it was a matter well worthy of consideration, and that it carried out what was Mr. Rumsay's idea on the subject, viz., whether we might not adopt some continental method by which the administration of such a law was confided to commissioners, appointed by a central authority, who, in the exercise of the power entrusted to them, were responsible only to the head of the State.

Mr. Rumsay said that was not exactly his idea. He did not propose the establishment of an irresponsible power, or of a body with responsibility only to a central authority.

Mr. Cowper had so understood him; but, passing by that point, he would observe that, in his opinion, sanitary matters could not properly be classed with those which affected overt offences against the person, nor be dealt with in the way that all obvious breaches of the law were dealt with in this country, viz., as a part of the police regulations of the State. For there was this distinction between them—that in sanitary matters what was required was, not to prevent persons from doing what they were inclined to do, but to compel them to do things which they ought to do. It was much more easy by Government authority to prevent an action than it was to compel an action. Therefore he believed if a system were adopted which compelled the local authorities to take steps for the purification of the dwellings of the persons living in their districts, such was the existing state of public feeling, that there would be a passive resistance manifested, which would render such a system utterly useless. They must on this point, as in reference to many others, trust to the common sense and the gradually-increasing knowledge of the persons charged with the execution of local sanitary arrangements; and he believed it would be far wiser not to take from the representatives of each community the powers which they ought to discharge, nor to despair of their improving and ultimately doing better, because in some cases they had hitherto failed. In reference to many sanitary measures, they had seen for a time the representative body neglecting their duty; but afterwards, when the subject came to be discussed, and clearer views as to the importance of the step were diffused, they had taken up and carried through with far better will and greater success, that which at first they omitted to do, than any central board could have secured. In our constitutional law the principle was clearly recognized, that no nuisance should be allowed to be perpetuated, either by communities or individuals, and this must always be the basis of our action on this subject.

The law of nuisance was one recognized by the common sense, and was congenial with the spirit of the people, but at present the modes of carrying it into effect were very difficult of application. The business of the Legislature was to attend to the adaptation of that law and the modes of its execution: if they confined themselves to that, they might hope to succeed. Mr. Rumsay had, he thought, cast a little discouragement upon the model lodging-houses erected in London. Now, it was vain to talk about a desire that there should be larger places for working men in towns, or of removing their residences to a distance; they must live near their work. Therefore, to his mind, it did seem very ingenious to erect buildings of considerable elevation when it was found impossible to enlarge the site. In the Streatham-Street houses, which were the best contrived, although the entrance from the street was by a common staircase, yet there was complete isolation preserved for each family, their apartments being as completely shut off as though in a separate building. He did hope that the example set in those model lodging-houses would be more widely followed; it was distressing to find that hitherto they had not been. There appeared to be no reason for this, except that speculations in buildings were not exactly what persons generally liked to undertake. That there must be something in this view of the case he was convinced, from the fact that, even with regard to houses for the rich, builders did not keep them on hand long. This might not be so much from a desire to turn their capital, as from the feeling that, though profitable for a short period, they were more doubtful investments when they came to want repairs. Our great chance, however, in improving the dwellings of the poor was in adapting them to their wants, and getting a proper return for the money invested. Those persons who had given special attention to this subject were the most to be encouraged, and their statements should receive the best consideration. One mistake often made in these matters was, that such persons, looking at these lodging-houses in a philanthropic point of view, had given rather better accommodation, and thus incurred greater expense in their erection than the rents received would justify. If the accommodation afforded by such dwellings, while thoroughly adequate, were no more than sufficient—if there was an absence of everything like luxury—then he believed a profit might be made by the investment, while the great object of such erections was fully secured.

Mr. TRIPE said, as one of the medical officers of health in London, and having the oversight of a district which was densely populated, he was fully sensible of the evils of overcrowding. There was a statement in the last paper read, to the effect that, if one person vitiated so much air by breathing, ten persons occupying the same apartment would vitiate it to ten times that extent. But there was a fallacy here which demanded attention. When air contained a given quantity of carbonic acid, if it was breathed again and again, a less amount of change was effected at every respiration. Further than that, it must always be remembered that what was given off in breath consisted of three parts, of gases, of vapours, and of animal matter held in suspension; and each of these three were subject to separate laws. The one, carbonic acid, obeyed the law of the mutual diffusion of gases; and it might not be known to all, that on the mountains of Switzerland, a far larger quantity of carbonic acid was found in the air than in the atmosphere surrounding the densest population known. This showed that the changes which took place in the crowded apartments of the poor did not depend upon the quantity of carbonic acid in them. But this fact should be steadily borne in mind. He believed it depended upon the quantity of organic matter which was breathed and was constantly passing off from the skin and the lungs. If the skin were not kept clean, a quantity of matter was cast inwards, and thrown off by some other organ. After quoting the opinion of Dr. Letheby in support of these views, he referred to another matter which he felt ought not to be lost sight off, viz., the influence of vegetable life in restoring the purity of the air which became vitiated by the breathing of animals, and which restorative agency was necessarily wanting in large towns. Passing to the consideration of labourers' cottages, he said that, of all the plans which had been laid before them by Mr. Hartshorne, it did not appear that any, allowing for the value of the site, would pay 2 per cent. upon their cost. It was, therefore, unreasonable to expect persons to invest money in such undertakings. With regard to lodging-houses, let it be remembered that the inmates were not the poor, but the better class of mechanics and artisans. The poor could not afford to pay the rent, and therefore they were quite shut out from them. As to the propriety of building in flats, it was well known that, according to the laws which regulated vapours, heated air always ascended; and therefore those who lived at the top of such houses would necessarily receive large portions of the vitiated atmosphere from below. It was notorious that, in the workshops of tailors in London, which were placed in stories one above another, the upper floor was always the fever floor; and this, not because of the gases which ascended, but because the gases going up carried with them the animal matter exhaled from those at work in the lower stories. It was not, therefore, desirable to erect such buildings; and as sufficient space could not be obtained in the heart of large towns to erect moderate-sized houses for the working classes, accommodation must be provided in the suburbs, and means taken for conveying the people to and from their work. There was one other point to which he thought sufficient attention was not paid, and that was, the enforcement of the repair and cleansing of dilapidated and unwholesome dwellings. Under the 13th section of the Nuisances Removal Act, the magistrates had power to make an order upon the owners of such property to effect these sanitary improvements; and in his own district, as medical officer of health, he had obtained such an order, and had a number of houses thoroughly repaired.

Mr. MICHAEL regretted that local boards of health were so straitened and had such inefficient powers. It was not only necessary for the well-being of town populations that there should be thorough drainage, but also an adequate water supply. In the borough of Swansea, during the prevalence of cholera, that part of the district which was supplied with pure water in abundance enjoyed almost perfect immunity from the epidemic. A line of demarcation drawn on the map, indicating the places where the disease attacked the greatest number, and proved the most fatal, showed that they were almost exclusively those where the water supply was deficient. But the Health of Towns Act did not contain powers enabling the boards to do what was absolutely necessary in this respect, for the rateable value of property would not allow of sufficient money being raised to drain and supply the district with water. Another deficiency in that Act was the difficulty it interposed in the way of obtaining magisterial interference in reference to the sanitary condition of the interiors of houses. He hoped, as one result of this meeting, that these points would be fully brought out, and such information of a practical character would be elicited as would help to guide Parliament in further legislating on the subject.

Dr. CONNOLLY hoped that this meeting would not leave the impression upon the country that a number of persons, living in considerable comfort themselves, were anxious to recommend legislative interference and enactments which should have effect only upon their poorer neighbours. He could not conceive of any reason that could be adduced for interfering with the interior of a poor man's any more than with a gentleman's house. It was not the state of his dwelling that was the sole cause of the deterioration of the poor man's health. There were many other causes, such as the want of sufficient food, clothing, &c. They might build what kind of houses for him they chose, but until something could be done to supply him with other necessaries of life as well as a dwelling, things would remain very much as they were. It had been urged against their habits that the sick were kept in the same room as the healthy; but although evils might arise out of this, it seemed to be rather the prompting of affection for invalid relatives, and a desire to have them at hand so as to be able to minister to their necessities, than any insensibility to the discomfort or the danger of the practice which had led to its adoption. The great question for this association was—Can we improve the social condition of these people? They wanted more good food and more good clothing—without which, what was the great advantage of their having a large number of rooms in their houses? In many instances wages were so low that the people could scarcely live, and until there was some alteration in this respect, he despaired of much improvement.

Mr. ADOLPHUS BACH, of London, said, whatever legislative enactments were passed, they would be but of little avail unless they were assisted by the people themselves. The question was, how could they be so directed and assisted that they would assist themselves? He believed that there was one branch of public education which had hitherto been almost totally neglected amongst all classes, and that was, instruction upon the preservation of health, and the elementary knowledge of the human frame. He suggested, as a subject for serious consideration, that it was highly expedient and desirable that in all schools, whether for the higher or lower classes, regular instruction should be given on these most important points—instruction adapted to the comprehension of the pupils; that such instruction should form a portion of every week's engagements; and that periodical examinations of the pupils should take place, to ascertain the progress made in their studies. He thought, further, that in all normal schools, lectures by competent medical professors should be given on the science of physiology, with a view to qualify teachers for communicating such knowledge in their various schools. It appeared to him that this might easily be accomplished, and that the Committee of Council on Education might fitly and justly require from any school to which Government assistance was granted, that such a course of instruction should be imparted. It was only by diffusing more correct information of the laws which govern human life and health, that any decided improvement could be expected in the sanitary condition of the community.

Dr. FARR said it appeared from the paper read, that, from the scale of rent charged by the Duke of Bedford for his cottages, the return on the outlay was only 2½ per cent, and in the case of Earl Spencer's cottages 2 6-10ths per cent. But although, in a pecuniary point of view, they did not pay directly, there were many indirect advantages arising out of the experiment. Amongst these, it was no small matter that these noblemen had healthy labourers on their estates. The farmers, too, got labour of a better quality and cheaper than they could have from men residing at a distance or in defective homes. As to city populations, he was persuaded that it was more advantageous to diffuse them over larger spaces—and there were facilities for doing so—than to heap them one over another in the lodging-houses of which they had heard.

Mr. AUSTIN, of the Board of Health, said he was afraid that the practical solution of the evils of overcrowding in towns, which they all so much deplored, was not to be found in the remedy which had been suggested—that of carrying the labouring classes to suburban districts by railway. Letting alone the enormous expense of a railway, or system of railways, in and round the metropolis, and taking it for granted that such railways were already executed, it would still be found that many thousands of working men would have to walk two, three, and even more miles to reach a station on such lines. And, supposing this difficulty overcome, there was the question of expense. Supposing that the railway companies, actuated by a spirit of benevolence, were to carry them at something like 2 per cent., even that would amount to 2s. per week, which in the case of many working men was a large proportion of the full rent they now pay. His attention had been specially directed to this subject from the fact that 14 years ago he was engineer to one of the metropolitan railways which passed through one of the worst of the densely-populated districts. During the execution of those works he saw many hundreds of poor families turned out of their abodes, and he always found that afterwards these people were located in the immediate neighbourhood where they formerly resided, although superior accommodation had been provided for them within a mile of the place. The fact was, their work was there, and it was impossible for them to move far from it. He thought it was hopeless, therefore, for them to look to the labouring classes being carried by railway from their places of employment to suburban residences.

The CHAIRMAN inquired of Mr. Austin whether, supposing there were a sufficient number of persons carried in and out of town, say a distance of ten miles daily, so as to make it worth the attention of railway companies, he had any idea, or had made any calculation, as to the probable cost?

Mr. AUSTIN replied that, looking at what it was now, he did not believe that any sufficient return could be made to the railways under 6d. per day. He had, however, assumed that it could be done for 4d. a day, and even that sum rendered the project altogether impracticable. Having given considerable attention to the matter, he believed that, by properly constructed dwellings, they could accommodate any number of persons that they were likely to have to make provision for, upon the present area of the metropolis. The actual extent of site occupied by a house was no criterion that it would be healthy or otherwise. If the sources of foul air externally were removed, and proper ventilation inside the building were introduced, the system of erecting dwellings for the working classes in flats was the true solution of the overcrowding difficulty. He believed that the metropolitan buildings had borne the test well; it was not a case of yesterday; they had been erected many years, and there had been a uniform low rate of mortality in them. And yet it was remarkable that the actual overcrowding in them was much more than in many places, the allowance being only 4½ yards to each individual.

Mr. PITTARD said no observation had been offered in reference to the effect of levels upon health. He thought a discretionary power should be given to local boards, and that they should not be called on to legislate upon the same principles in places where there was a column of air under a pressure of 230 as in places where it was only 15.

Mr. RAWLINSON, C.E., said he had personally inspected the great seats of disease in England, from Falmouth to Berwick-on-Tweed, and he believed, in a broad sense, that levels had nothing to do with the matter. Disease followed certain laws, which had nothing whatever to do with this subject; and in some places below the level of the sea cholera had not prevailed,

while in others, as at Mevagissy, in Cornwall, 600 feet above the sea, and with fresh breezes blowing over it constantly, it had committed fearful ravages. The great mischief was overcrowding and want of ventilation. But the condition of the poor, after all, was not so hopeless in this respect as had been represented, and he believed that it was possible effectually to overcome the evils which had been referred to at such a moderate cost as should place the means of personal cleanliness and comfort within the reach of all.

The CHAIRMAN, in closing the discussion, said no one seemed to doubt the extent of the evils which arose from overcrowding—indeed, it was acknowledged as a great, perhaps the greatest, predisposing cause of disease. The two questions which had been raised in the discussion were, what can Government or public bodies do? and what can be done by individuals to remedy this state of things. Now, in reference to the action of the local authorities in the past, he thought that though they had great cause to complain of the conduct of many boards of health, still they were bound to remember that this sanitary subject was comparatively a new one to the community in general. A great deal of indifference, or what looked like indifference, was really mere ignorance. Information propagated itself very slowly in this country, and that very fact was in the end the best security for its permanence when established. As to compelling local boards, except in the most extreme cases, to take upon themselves the responsibility of action, he agreed with his right honourable friend (Mr. Cowper) that, whether this was justifiable on grounds of policy, or desirable in itself, it was simply impossible. You might interfere by a general law to prevent a thing being done, but to compel a body of men to act, in reference to a rather complicated matter, against their own opinions, would obtain no satisfactory result. There was only one point on which he thought the law might interfere, and that was, as to the structural arrangement of buildings. In that case there could be no concealment and no mistake; the evil, where it existed, was easy to detect, and the restriction which might be placed on builders would be simply analogous to those which were already adopted. As to internal arrangements, he confessed that, until there was a different feeling and a more advanced state of public knowledge on sanitary matters, it would be almost impossible to interfere more than was at present done. Let it be remembered that ignorance of sanitary laws was not peculiar to the poorer classes. Sir Francis Head once remarked, in reference to the ventilation of public buildings and places of resort for the rich and educated classes, that there was as much pains taken to exclude fresh air from entering as possible, and he could compare it to nothing else except that of filling a glass vase, having fish in it, with the foulest water, and, after closely corking it, sinking it in a deep river, where, though there was pure water all around, the poor fish were effectually shut in from participating in its benefit. While this was too truly the case with those who ought to know better, we should not be too impatient with those who had few opportunities for knowing, and fewer facilities for carrying out, what was so desirable. As to the great subject which really deserved attention, that of scattering the population of our great cities, he thought we had hardly yet arrived at that stage when we could express a decided opinion. Although it might be true that the cost of conveyance in and out of town was so great as to prevent the poorer classes availing themselves of it, still there was a process going on in London and other great towns which did tend to produce a diffusion of the population. All those who were at all able to afford the expense, were gradually adopting the system of residing in the suburbs, and keeping only sufficient premises in the heart of the town for the purposes of their business. In fact, as regarded the well-to-do classes, you might regard London as a ring, populated all round the outside, and hollow in the centre. As the social position of our great cities improved, and the means of the working classes increased, it would be found that a large portion of the population—not, perhaps, the very poorest, but many of our labouring men—would gradually resort to the same course; and thus a considerable diminution would take place in the numbers of those who resided in the centres of large towns. As to erecting cottages for the humbler classes in rural districts, the subject might be summed up in few words. They did not pay directly; they did pay large landed proprietors indirectly. They paid any one who had a sufficient interest in the local rates and general burdens of the neighbourhood—who was, as in some cases, responsible for the whole. In other cases, where there were many to share the burdens, there would always be a tendency to buy land as a speculation, and run up houses of the cheap and nasty kind, which for a while gave a large return. There was, however, a custom growing up in Lancashire and many other places which might have a beneficial tendency by-and-by. The better class of labouring men liked nothing better than investing their savings in the purchase of small pieces of land, on which to build houses for themselves. The manufacturers were in the habit of encouraging that practice; and though, perhaps, at present the houses so erected were not all that could be desired, he had hopes that, as these persons became better acquainted with what was necessary to ensure the comforts of a healthy habitation, very great improvements would be effected in this respect.

HEALTH OF THE WATER-GUARD OF HER MAJESTY'S CUSTOMS.

Dr. M'WILLIAMS read a paper on this subject, which showed that, notwithstanding the arduous duties which this class of officers has to perform, and their exposure to all kinds of weather, the mortality amongst them—especially those engaged on the Thames between the Custom-House and Gravesend—is very small.

Dr. FARR said, when it was recollected that some time ago even a moderate state of good health at sea was rare, he thought the paper just read was a valuable testimony to the advantages of sanitary measures on board ship.

The CHAIRMAN inquired what was the rate of mortality in the navy during the last century?

Dr. FARR: Not less than 30 in the 1000.

Dr. M'WILLIAMS: More than that.

Mr. CHADWICK: My Lord Anson lost two crews in one voyage; and now, excluding accidents, the mortality is only eight.

Dr. M'WILLIAMS said Lord Anson's case was not a singular one at that time, only his voyage was a long one. In proportion to the length of the voyage the whole of the navy was in the same position as Lord Anson's ships. He (Dr. M'Williams) did not of course advocate insubordination; but he could not forget that the effect of mutiny was that the navy was better supplied with food and clothing than before. The introduction of lime-juice had greatly reduced the mortality from scurvy. Scurvy, indeed, was never seen now except in the mercantile marine.

Mr. CHADWICK said there was no doubt that sewerage matter, even when excessively diluted, was bad enough; but the evil had been grossly exaggerated. According to the statements made by some people as to the effect of London sewerage, the Thames ought to be the focus of disease; and no able-bodied man ought to be found in any of the ships floating upon it. But Dr. M'Williams' statements as to the services which the Custom-House officers rendered, and the good state of health they enjoyed, effectually replied to all those exaggerations.

Dr. FARR and Mr. PITTARD offered some further remarks upon the paper.

To be continued.)

GAS EXPLOSION AT ISLINGTON.—Great alarm was created on Tuesday morning by a loud explosion in the private residence of the Rev. Wm. Vincent, M.A., known as Belitha Cottage, Barnsbury Park, Islington. The reverend gentleman, who is the incumbent of Trinity Church, Cloudesley Square, had his attention directed to an unusual smell of gas after he had retired to rest, which caused him to get up and to examine the premises. Unfortunately, he took with him a lighted candle, and no sooner did he enter his study than a loud and fearful explosion took place, which completely prostrated Mr. Vincent, and shook every part of the house, besides alarming the inmates, twelve in number. The study was partially blown down, and so was a part of the staircase, and the rest of the house was seriously damaged. The cause of the misfortune was the gas escaping from a telescope pendant, which had accumulated in the chamber. The contents of the house are damaged, and the windows are all blown out.

ELECTRIC LIGHT.—We learn that the launch of the Great Eastern steamship, which it is expected will take place early in the coming month, will be effected under the brilliancy of the electric light, as far as the moving of this wondrous iron monster is done during the night, and which must occupy a considerable portion of the darker hours, seeing that it will require a period of at least 16 from the moment of her first leaving the upper stays, or cradle, until she quietly rides in her future element. It is to be presumed, therefore, that the commencement will be during the night, and that her final glide into the river may be witnessed by thousands in the clear light of day. The

Price Current.

CASTINGS, per Ton.

Average Weight of Cast-Iron Gas-Pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow	Newcastle.	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	4 10 0	3 0 0	3 7 0	4 0 0	4 5 0
1¼ and 2 inches Socket Pipes	7 15 0	7 0 0	7 5 0	7 10 0	7 5 0
2½ and 3 " " "	7 5 0	6 15 0	7 0 0	7 5 0	7 0 0
4 and 5 " " "	7 5 0	6 10 0	6 15 0	7 0 0	6 15 0
6 in. & upwards " "	7 0 0	6 5 0	6 5 0	6 15 0	6 5 0
Retorts, 1st fusion, hot blast	6 15 0	...	6 15 0	7 0 0	6 15 0
" 2nd " cold "	7 15 0	...	7 0 0	7 5 0	7 0 0
Tank Plates, ⅜ thick and above	7 5 0	6 10 0	6 15 0	7 0 0	6 15 0

COALS.

NEWCASTLE.	s.	d.		SCOTCH CANNEL.	per ton.
Unscreened.				Boghead, at Leith	32s. 0d.
Whitwell Primrose	6	3	per ton	Kirkness, best	23 0
Pelton, Medomsley, & Burnhope	6	6	"	Capeldrae, 1st quality	20 0
Pelaw	6	9	"	" 2nd "	12 6
Eighton Moor, New Pelton, Peareth, South Pelaw, Washington Hutton, & South Peareth	7	0	"	Lesmahago, at Glasgow	25 0
				" " Leith	27 6
				Arniston	22 0
				Wemyss	20 0
				Knightswood	18 0
Ramsay's Newcastle Cannel	16	0	"	Pirnie	15 0

SUNDRIES.

Best Newcastle fire-bricks	60s. per 1000	Welch bar iron, in London	£8. 10s. per ton.
" " " clay	12s. per ton.	Foreign spelter	£30 "
Cliff's fire-bricks at Wortley	57s. 6d. p. 1000	English block tin	£135 "
Tough cake copper	£121. 10s. per ton.	Banca " "	£134 "
English pig lead	£24. 10s. "	Tarred rope yarn	26s. per cwt.

WROUGHT-IRON TUBING, subject to 40 per cent. Discount.

	2 inches.	1½ inch.	1¼ inch.	1 inch.	¾ inch.	½ inch.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent welded tubes, from 2 to 12 feet, per foot	1 8	1 0	0 10	0 7	0 5	0 4½
" " " 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting pieces, or long screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, springs, and elbows—wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron cocks	17 6	9 6	7 6	4 6	3 3	2 6
" with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing sockets, caps, plugs, and nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	

FREIGHTS, per Ton.

Coastwise—Newcastle.		*Foreign.*	
Chatham & Roches-	6s. 9d.	Boulogne	8s. 6d
Cork [ter	10 3	Barcelona	26 0
Dover	7 0	Bordeaux	16 6
Dublin	11 3	Cadiz	15 0
Exeter Quay	9 6	Calais	8 6
Folkestone	7 0	Dieppe	10 0
Hastings	8 6	Genoa	23 6
London	7 3	Hamburg	12 0
Lowestoft & Yar-	5 0	Havre	11 0
Lynn [mouth	5 6	Leghorn	24 0
Portsmouth	8 6	Lisbon	17 0
Plymouth	9 3	Rotterdam	9 9
Whitstable	6 9	Stettin	10 0
Weymouth	8 6	Trieste & Venice	26 0

use of the electric light will, therefore, be of great moment in this important operation, in which, it may be said, the whole nautical world is interested. On the other hand, it will fully test the merits of the various improvements made in the system of removing darkness; for, if the lights to be erected burn steadily and brilliantly throughout the night, they will meet the requirements of the Trinity House as respects the illuminating power for lighthouses. The brilliancy of the electric light has never been questioned, and the great difficulty hitherto has been in securing density and steadiness. These points are overcome, we are assured, by the application of mercury instead of carbon points; and that a lunar light, pure, dense, steady, and continuous, is now obtained. This, as we have already said, will now be fully and publicly tested. The point to be determined is even of more universal interest than the Great Eastern steam-ship itself; for, if what is represented be established beyond controversy or dispute, a great national boon will be secured. Nothing can be of greater value to this country than an efficient and powerful light for the coast. Those now in use are not sufficiently effective, and, during fogs and severe weather, are frequently useless beyond the immediate precincts of the lighthouses, whereas the new light—the mercurio-electric, we suppose it may be called—is unchangeable in colour, and its penetrating powers in fog and thick weather are represented as perfectly extraordinary. Little has been said or is known of this new plan of overcoming the difficulties which carbon light presented, but the discoverers have been persevering in their trials and tests so as to make every point perfect before its submission to public display. We understand that the discovery is due to Professor Way, but that other gentlemen identified with the prosecution of the question of electric light have assisted in bringing the matter to its present state of perfection. The test to which it is to be put is a bold one, and is of itself an earnest of the sincerity of those who consider it perfect for all useful purposes. We trust their efforts will be crowned with success as brilliant as their own light, not only on their account, but as a matter of national import and interest. It will be a grand feature indeed in this extraordinary feat of launching this monster ship.—*Mining Journal*.

Advertisements.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

BRYAN DONKIN and CO.'s improved GAS VALVES have been adopted by numerous Gas Companies in England and abroad, and their advantages and great security fully proved. Very large numbers are in use. Prices from 11s. 6d. to 13s. 6d. per inch diameter.

BRYAN DONKIN and Co.,
Engineers, near Grange Road, BERMONDSEY.

NOTICE.—Mr. N. DEFRIES, Consulting GAS ENGINEER, begs to inform gas companies and the public, that he is desirous of meeting any gentlemen at his WORKS, NEW ROAD, ST. PANCRAS, where, under his own superintendence of the manufacturing department, they will have the fullest opportunity of investigating the many improvements he has recently effected in his ROTARY-VALVE DRY GAS-METER, by which full security will be afforded against leakage and non-registration, even against the searching effects of Cannel Coal Gas. The Rotary-Valve Meter is warranted to register inflexibly correct at a working pressure of half a tenth, and less than a quarter of a foot per hour upon a blue light; and a guarantee will be given to all gas companies to keep it in repair for not less than five years, free of expense. With this meter the gas-supplier may fully depend upon a fair return, and the public upon having a just measurer.

GAS BATHS, GAS COOKING and HEATING STOVES, for all classes. The British Polytechnic Gas-fire, &c. Conservatories and Buildings heated by gas, and perfect ventilation secured.

Any gentleman desirous of consulting Mr. Defries in especial cases, may meet him either at his office, 145, REGENT STREET, or at his residence, 5, FITZROY SQUARE, b giving one day's notice.

Gas-works erected for private houses, where no gas company exists.

EIGHTON MOOR GAS COALS.— Parties wishing to be supplied with these first-class Gas Coals will please to apply to Mr. MATTHEW NESBIT, EIGHTON MOOR OFFICE, NEWCASTLE-UPON-TYNE. These coals are well known as among the richest in gas, and working the roundest on the River Tyne. They are extensively used by metropolitan gas works.

PIRNIE CANNEL.—The Proprietors of the PIRNIE COAL COMPANY are now prepared to ship their excellent Gas Coal in the Frith of Forth, or put it on the East Fife Railway. It contains but little sulphur, and yields over 10,000 feet of 26 candle gas per ton. For particulars apply to Mr. ROBERT CARRICK, Manager, PIRNIE COLLIERY, LEVEN, FIFE

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JAMES LYNE HANCOCK'S Vulcanized Indiarubber Hose Pipes and Tubing. Manufactory (and Warehouse), Goswell-mews, Goswell-road, London.

Gas Companies, Engineers, Gas Fitters, and the Trade generally, are respectfully informed this Tubing is now manufactured to any size, from ¼ inch bore and upwards, in 100-feet lengths, and perfectly cylindrical, either with or without a spiral wire inside.

VULCANIZED GLAZED FLEXIBLE TUBING, from ¼ inch up to 1 inch diameter, made in 24-feet lengths; or, covered with silk or worsted, up to 100 feet.

VULCANIZED HOSE, for FIRE ENGINES, BREWERS' USE, and for standing great pressures, (Rubber and Cloth combined), made to any length or size to fit the necessary screws, &c.

VULCANIZED INDIARUBBER AIR-TIGHT BAGS, made any size, for Gas Mains, with flexible tubes attached, and fitted with stopcocks complete.

By Royal Letters Patent.

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PATENT EQUITABLE GAS-METER

is the most effective preventive of fraud by "tilting," and is as simple in construction as the common meter.

Manufactured only by

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THE Objects most to be desired in EFFECTING A LIFE ASSURANCE.—These are, Perfect Security and the Largest Benefits in proportion to the Contributions paid. They are both fully attained in the SCOTTISH EQUITABLE LIFE ASSURANCE SOCIETY, which is now of 26 years' standing, and possesses Accumulated Funds, arising from the contributions of Members only, amounting to upwards of £1,000,000 sterling, and has an Annual Revenue of upwards of £176,000.

The MUTUAL PRINCIPLE being adopted, the entire surpluses or "Profits," as ascertained Triennially, are allocated in addition to the sums assured, and they present a flattering prospect to the members. For example, the sum now payable on a policy for £1000, effected in 1831, is £1590. 5s. 8d., being a return of 71 per cent. on the premiums paid on middle-aged lives, and policies effected in later years are similarly increased.

The NEXT TRIENNIAL DIVISION of PROFITS will take place on March 1, 1859.

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PATENT GAS METER & APPARATUS WORKS,
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Manufacturers of WET and DRY GAS METERS, STATION METERS, GOVERNORS, EXPERIMENTAL APPARATUS, GAS STOVES, and LANTERNS.

Contractors for the erection or alteration of Gas Works; and every description of Apparatus required in Gas Works supplied.

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GAS ENGINEER, &c.,
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Mr. KERBY is prepared to design Apparatus for the Manufacture of Sulphate, Muriate, or Carbonate of Ammonia.

He would call the attention of Gas Managers to the importance of converting their comparatively unsaleable "Ammoniacal Liquor" into an article easily disposed of.

Gas or Water-Works surveyed for alterations or enlargement. Plans, Specifications, &c., on strictly moderate terms.

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MANUFACTURERS OF DINAS FIRE BRICKS AND RETORTS,
NEATH, GLAMORGANSHIRE,

Beg to draw the attention of the Engineers and Managers of Gas-works to the superior quality of their goods, and more especially to their BRICK RETORTS, which, in addition to the almost infusible nature of the Fire-Clay employed, have the great advantage, from its large excess of Silica, of EXPANDING BY THE APPLICATION OF HEAT, and consequently becoming sounder and less liable to leak by use. Their cost is less than that of the ordinary Clay Retorts.

Young and Allen's DINAS FIRE-BRICKS and CEMENT have been long used for the linings of furnaces exposed to high temperatures, and are well known in the London and other Gas-works. They can be forwarded by rail to all parts of the United Kingdom, and shipped by sea to all parts of the world.

Prices on application as above.

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PROPRIETORS OF
BEST CLASS-HOUSE POT AND CRUCIBLE CLAY
MANUFACTURERS OF
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AMBLECOTE FIRE CLAY AND BRICK WORKS,
STOURBRIDGE.
Late in the occupation of I. and W. King.
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DEEPDALE FIRE-CLAY AND BRICK WORKS
Near DUDLEY,

Manufacturer of every description of Fire-Bricks, Lumps, Quarries, Shields, Flue Covers, &c., to any size or shape required.

FIRE-CLAY RETORTS,
TO MODEL OR DRAWING.

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MANUFACTURERS OF EVERY DESCRIPTION OF
FIRE BRICKS, CLAY RETORTS, LUMPS, TILES,
&c. &c.
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A large stock of Fire-Clay Goods always on hand in London, at the lowest wharf prices, at Messrs. CHRISTIE and Co.'s Wharf, 64, Bankside, SOUTHWARK.

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is prepared to supply Gas and Water Companies with Apparatus and Appliances of every description, including Cast and Wrought Iron Goods, Coals, Fire-Bricks, Retorts, &c. &c.

Any communications addressed to him as above shall have prompt attention.

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No. 19, York Street North, Hackney Road.

Thirty years RETORT SETTER to some of the leading London and Provincial Gas Companies, to whom he can refer, begs leave to draw attention to his economical mode of Setting Clay or Iron Retorts, &c.

F. S. will engage to provide all materials and labour, or labour only.

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Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

WHITEHOUSE and CO.,

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Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.

Orders promptly executed.

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PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

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whose Goods are all well Tested and Warranted.

Inventors and first manufacturers of Lap-welded Flues for Locomotive and Marine Boilers.

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GAS AND CONSULTING ENGINEER,

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which may be had, either combined with the Engine; combined with both Engine and Boiler, and Portable; or separate, by itself. Also, his

FOUR-WAY PURIFIER, CHANGING BY-PASS, & SHUT-OFF VALVE,

one of which answers the purpose of THREE ordinary Valves, in connecting Purifiers, or in shutting off and passing a Station-Meter, or other apparatus. Also his

RETORT SETTINGS,

by which any number of Retorts, up to Twenty, can be heated by one Coke and one Tar Fire, reducing the fuel account in many instances to one-half of what it now is, and without the production of any smoke.

Mr. Anderson has been extensively engaged for the last ten years in the Construction and Management of Gas-Works, and all his improvements have been brought into successful operation under his own eye previous to being submitted to the public.

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GLASS REFLECTORS

are the most durable, and are cheaper and better than any other.

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These Meters are as simple and durable as the Gas-Meter, and as correct as that instrument in the registration of the fluids passing through them.

By Her Majesty's Royal Letters Patent.

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Experimental and Station Meters of any size made to order on the shortest notice.—Governors, Pressure Registers, Gas-cooking Stoves, and every description of Gas Apparatus.

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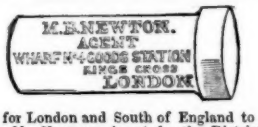

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Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.

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MILL BANDS, HOSE PIPES, & FIRE BUCKETS made to order from the best-selected Oak-Bark Tanned Leather.

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Price, from 18s. 6d. each, and upwards.

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GAS BATHS, HEATING COILS, TORCHES, &c.

Also,

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Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

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N.B.—Repairs on the lowest scale.

J. JONES, Iron Merchant, 6, Bankside, has long been known to sell the following Castings at prices lower than any other house in London:—Socket and Flange Pipes, Bends, Branches and Tees, Syphons, Lamp-posts, Rain-water Pipes, &c.; also, Hot Water Pipes, Elbows, Tees, Cylindrical and Saddle Boilers, and every Fitting for the same. Drawings and Prices of the above on application to J. Jones, Iron Bridge Wharf, 6, Bankside, near the Southwark Iron Bridge.

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WILLIAM SMITH, by the improvements he has made in the Wet Meter, and which he has secured by her Majesty's Royal Letters Patent, the accuracy of their registry is rendered certain by the introduction of the adjusting slide and hydraulic, whereby a Perfect Water Level is readily obtained, and the Hydraulic precludes the possibility of abstracting water from the meter by increased pressure or otherwise, thus surmounting the great desideratum of the Wet Meter. In his Patent Equitable Gas Meter neatness and strength are combined, the backs and fronts of the case being stamped by powerful machinery out of thick plate iron (tinned or galvanized); and the internal construction is of the best metal, which will resist the action of any impurity in the gas.

Old Meters may readily have the adjusting slide and hydraulic applied, thereby having accurate measurement assured.

Station Meters, Governors, &c., made on the shortest notice.

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CONSUMERS' METERS at the List Price, with a Liberal Discount to Wholesale Purchasers.
THOMPSON'S BROMINE TEST, £1. 1s.—BROMINE, 3s. per Ounce.
BISULPHURET OF CARBON TEST, £2. 2s.
APPARATUS FOR DETERMINING THE HEATING POWER OF SAMPLES OF COAL AND OTHER DESCRIPTIONS OF FUEL, £5. 5s.,
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REGISTERING PRESSURE GAUGE, Net Price, £8. Glass Shade, 10s. extra.
STATION METERS, PRESSURE GAUGES, PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, &c.

JAMES OAKES and CO.,
ALFRETON IRON WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,
Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including best cold-blast Iron Retorts, Socket and Flange Pipes of all sizes, Bends, Branches, Syphons, Lamp Columns of various patterns, &c.
N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.
CHARLES HORSLEY, Agent.
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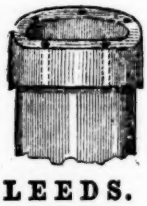

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